

# MINUTES OF PROCEEDINGS

OF THE

## SPECIAL ORDNANCE COMMISSION.

APPOINTED BY ORDER OF THE GOVERNMENT OF INDIA.

No. 874, DATED 17<sup>TH</sup> JANUARY 1874.

*President.*

MAJOR GENL. F. TURNER, C.B., R.A., *Inspector-General of Ordnance and Magazines, Bengal.*

*Members.*

COL. W. S. HATCH, R.A., *Superintendent, Gun Carriage Factory, Bombay.*

COL. A. STEWART, R.A., *Inspector-General of Ordnance and Magazines, Madras.*

A. L. HALIBURTON, Esq., *Deputy Accountant-General, Military Department.*

LIEUT.-COL. C. M. MACGREGOR, B.S.C. *Assistant Quarter-Master-General.*

*Secretary.*

LIEUT. E. H. H. COLLEN, *Assistant Secretary to the Government of India*  
*-, Military Department.*

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CALCUTTA:  
OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING.  
1875.

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*Minute No. 1, dated 9th February 1874.*

Resolution of Government of India, No. 874, dated the 17th January 1874, was read and also the instructions for the guidance of the commission.

Letters No. 294A of 6th February 1874 and No. 338 of 24th January 1874, from Governments of Madras and Bombay, were read, appointing Colonels Hatch and Stewart, R. A., Members.

The President and Members of the Commission were all present, viz:—

PRESIDENT :

*Major-Genl. F. TURNER, C. B., R. A*

MEMBERS :

*Col. S. HATCH, R. A.*

*Col. A. STEWART, R. A.*

*A. L. HALIBURTON, Esq.*

*Depy. Acct.-Genl., M. A. Dept.*

*Lieut. COLLEN, R. A., Secy.*

The papers as per appendix were laid before the Commission.

In accordance with the instructions of the Government of India, the Commission proceeded to consider the manufactories, and determined that the order in which these should be taken, and the mode of procedure should be first settled. It was decided that the following should be the order and mode of procedure.

I.—*Powder Factories.*

1. Requirements of India according to Military Department No. 503, dated the 10th October 1873.

2. Manufacturing capacity with present establishment.

II.—*Carriage Factories.*

1. Requirements of India for—

(a) Artillery.      { Field.  
                             { Siege.  
                             { Garrison.

(b) Miscellaneous. { Ordnance.  
Other Depts., &c.

calculated on supply of past years.

2. Manufacturing capacity as above.
3. Supply of timber.

### III.—*Small Arm Ammunition Factories.*

1. Regiments of India in regard to laboratory stores.
2. Manufacturing capacity.

### IV.—*Harness and Saddlery Factory.*

1. Requirements of India as to harness and saddlery.

2. Method of supply in each Presidency and capacity of source of supply.

It was determined that the Cossipore Shell Factory should be considered at some future time.

The Secretary was requested to obtain information from the various manufacturing establishments, in accordance with the above scheme.

The Commission adjourned at 3 P. M.

Carried out by Special Ordnance Commission, to Gun-powder Agent, Ishapore, No. 4 of 9th February 1874.

To Inspector-General of Ordnance and Magazines, Bombay, No. 4A of 9th February 1874.

To Inspector-General of Ordnance and Magazines, Bengal, No. 5 of 9th February 1874.

To Examiner of Ordnance Accounts, No. 6 of 9th February 1874.

From Inspector-General of Ordnance and Magazines, Madras

Bombay, Nos. 7-8 of 9th February 1874.



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*Minute No. 2, dated 10th February 1874.*

The Commission met at 12 noon.

Minute No. 1 of 9th February 1874, was read and confirmed.

The Commission discussed the details of the information necessary to be obtained in regard to the manufactories in India, and it was determined with reference to Minute 1, as follows :—

#### *I.—Powder Factories.*

Carried out by Special Ordnance Commission, Nos. 4-4A, dated 9th February 1874, to Agent Gunpowder, Ishapore, and Inspector-General of Ordnance and Magazines, Bombay.

To ask for information as regards “manufacturing capacity” upon the form supplied by Colonel Stewart from Bengal and Bombay. The information from Madras was handed in by Colonel Stewart. The information to be given in pounds, but that it should also be intimated how many pounds are actually contained in each barrel.

#### *II.—Carriage Factories.*

It was determined that in regard to (1) Requirements, the annual average of three years ending the official year 1872-73, should be taken.

#### *III.—Small Arm Ammunition Factories.*

Carried out by Special Ordnance Commission, Nos. 15-16, dated 11th February 1874, to Inspector-General of Ordnance and Magazines, <sup>Bengal</sup> Bombay.

The Commission decided to obtain information in regard to the requirements of the army by calculating the amount as laid down under the orders of Government.

#### *IV.—Harness Factory.*

Carried out by Special Ordnance Commission, Nos. 12, 13 and 14, dated 11th February 1874, to Inspector-General of Ordnance and Magazines, <sup>Bengal</sup> Madras, <sup>Bombay</sup>

It was determined to ask Inspector <sup>Bengal</sup> General of Ordnance <sup>Madras</sup> the requirements of the army of each presidency, based on average amount of supply of harness and saddlery during the three years ending 1872-73, and also the method of supply and the capacity of the source of supply.

Carried out by Special Ordnance Commission, Nos. 9, 10 and 11, dated 10th February 1874, to Inspector-General of Ordnance and Magazines, <sup>Bengal</sup> Madras, <sup>Bombay</sup>

The Commission decided to obtain information as to the actual delivered cost of the principal items of raw material per unit of bulk or measurement, at the several factories, as

Timber,

Metals,

Fuels,

and that the mode in which the calculation is arrived at.

In regard to the question labor, it is decided to ask the Inspector-General of Ordnances of the three presidencies for the rates of pay of the extra artificers and laborers employed in the various factories, and also the current and local rates.

The Agriculture, Revenue and Commerce Department to be asked demi-officially if they have a statement of local rates of wages throughout India.

In considering the question of arsenals, &c., the Commission decided that for the purpose of the Commission, the Ordnance Establishments shall be divided into—

(a) Arsenals.

(b) Depôts.

That the term "Arsenal" shall be considered to signify an establishment for the receipt, storage, issue, construction and repair of all munitions of war.

That the term "Depot" shall be held to signify an establishment for the storage of reserves of ammunition for the troops in the district or neighbourhood dependent thereon.

The Commission adjourned at 2-15 P. M.

Carried out by Special Ordnance Commission, Nos. 18, 19 and 20, dated 12th February 1874 to Inspector-General of Ordnance and Magazines, Bengal, Madras, Bombay

Reply by demi-official, 11th February 1874, from Department, Agriculture, Revenue and Commerce.



*Minute No. 3, dated 11th February 1874.*

Minute No. 2 of 10th February 1874, was read and approved.

The discussion in regard to the question of local rates of wages was continued, and it was decided to ask for these rates for the extra establishments of all Ordnance Establishments throughout India.

Colonels Stewart and Hatch proposed that, as the Commission would be unable to meet on the following day, they should visit the Gun Powder Factory at Ishapore; this was agreed to, and it was decided that the Commission should visit the Arsenal at Fort William on Saturday.

In connection with the present location and work of arsenals, it was decided to draw up a form, upon which to show the arsenals, magazines and depôts, the military stations and number of units dependent thereon, and the distances by rail, road, and water from the source of supply. The form was accordingly prepared.

The Commission adjourned at 1-15 p. m.



Minute No. 3 of 11th February 1874, *Minute No. 4, dated 13th February 1874.*  
was read and approved.

The Commission decided that pending the receipt of information called for regarding the factories, and in any discussion on the arsenals &c., the first step to be taken was to determine what paras. of the instructions can be discussed at the present time, and what points can be deferred until the Commission have visited the arsenals, &c.

Each para. of the instructions having been discussed, decision was come to as follows :—

(a.) To be discussed in so far as the main arsenals at the bases of operations.

(b.) In reference to this para., the Military Department to be asked for information as follows:—

Carried out by Special Ordnance Commission, No. 30, dated 14th February 1874, to Military Department.

1. Strength of troops and their armaments and equipments.

2. Means of supply of arms and ammunition.

3. Position of any arsenals or factories.

(c.) Under consideration.

(d.) To be deferred.

(e.) Ditto ditto.

(f.) To be considered.

(g.) Ditto ditto— Colonels Hatch and Stewart to draw up a list of questions which they desire to put to Commissaries of Ordnance with a view to ascertain whether the system of supplying a large body of troops from one arsenal be satisfactory.

(h.) The Inspectors-General of Ordnance of each Presidency to be asked for a list of the usual articles of raw material, whether local or foreign, supplied to each Ordnance Establishment, and what the resources of the locality or neighbouring country are in regard to these supplies, and the prices at which they can be obtained.

Carried out by Special Ordnance Commission, Nos. 27, 28 and 29, dated 14th February 1874, to Inspector-General of Ordnance and Magazines, Bengal, Madras, Bombay

(i.) Information has been asked for.

(j.) Information to be called for of the cost for transport per cwt. from each source of supply to each military station dependent thereon, distinguishing the cost of the different kinds of transport.

Carried out by Special Ordnance Commission, Nos. 24, 25 and 26, dated 14th February 1874, to Inspector-General of Ordnance and Magazines, Bengal, Madras, Bombay



Carried out by Special Ordnance Commission,  
Nos. 21, 22 and 23, dated 14th February 1874, to Ins-  
pector-General of Ordnance and Magazines, Madras.  
Bengal  
Bombay

(k). To ascertain the cost of transport per ton from the primary source of supply including all freight, &c., to each factory or arsenal.

II, III, IV to be deferred.

V. In regard to V, the Commission decided to meet at the Fort William Arsenal the following day.

The Commission adjourned at 2-45 P. M.



The Commission met at the Arsenal, Fort William, at 10 A. M., and examined the books &c., of the arsenal, which were laid before them by the Commissary of Ordnance. *Minute No. 5, dated 14th February 1874.*

They examined the morning report showing the strength and distribution of the establishment. The distribution of warrant and non-commissioned officers, the ranges of their duties, and the general grouping of stock in the hands of shareholders were then examined. The mode of the transactions of business in the receipt and issue departments was enquired into. The method in which indents were dealt with, their registry and their disposal were explained. The Commission then examined the monthly work report, showing the manner in which material and labor were employed.

The harness, saddlery, and accoutrement store was then visited, and the books inspected.



*Minute No. 6, dated 16th February 1874.*

The Commission met at the Arsenal, Fort William, at 10 A. M.—They inspected the armoury and the books, ascertained the course followed in the receipt of arms. They found the books up to date, and that few indents were uncompiled with. They subsequently inspected the fort armament and miscellaneous stores and the park with the same result.



The Commission met at 10 A. M.

*Minute No. 7, dated 17th February 1874.*

In accordance with the plan decided upon in Minute 4 of 13th February 1874, the Commission discussed para. (a) of the instructions, and are of opinion that the primary bases of military operations throughout India in respect to other offensive and defensive purposes are,—

1st.—Bombay,

2nd.—Calcutta and Kurrachce,

on which points the main lines of communication converge.

The Commission decided to continue the inspection of the Fort William Arsenal, to visit the factories of Cossipore and Dum-Dum, and to request the sanction of Government to leave Calcutta on or about the 1st March, to visit Allahabad, Cawnpore, Fatchgarh, and Agra.

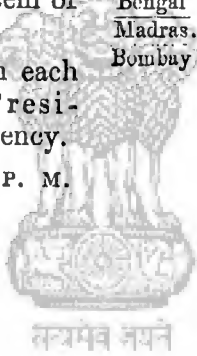
Carried out by Special Ordnance Commission, No. 36, dated 20th February 1874, to Military Department.

The Commission decide in regard to clause V. of the instructions, to ask for memoranda showing the exact system of supply of—

- |                   |                               |
|-------------------|-------------------------------|
| (a) Ammunition.   | { in each<br>Presi-<br>dency. |
| (b) Camp equipage |                               |

Carried out by Special Ordnance Commission, Nos. 33, 34 and 35, dated 18th February 1874, to Inspector-General of Ordnance and Magazines, Bengal  
Madras.  
Bombay

The Commission adjourned at 2 P. M.





*Minute No. 8, dated 18th February 1874.*

The Commission continued the inspection of Fort William Arsenal at 10 A. M.

They visited import branches and found those of receipt and issue. System the same as in other branches. The permanent Conductor of Issue keeps a register of all stores demanded or *indent*, and is bound to bring any delay in supplying demands to notice of Commissary. Conductor of Issues complained much of want of a permanent assistant, of frequent removals of Non-Commissioned Officers from his branch and consequent difficulty in package of stores.

Also visited Timber-yard stock of half-wroughts and timber large. Commission were informed that teak is purchased stored, partly seasoned, sawn, and supplied to Fatehgarh Agency from Fort William in half-wrought form, the best half-wrought only being sent to the Agency, and that coal and iron are also supplied to Fatehgarh, Cossipore and Ishapore from Fort William. English steam coal apparently used throughout. Commission shewn that many Non-Commissioned Officers are employed on board-ship in superintending landing of stores, which is stated to cause inconvenience.

The Commission also visited the arsenal workshops, noted the fact that all stores demanded by any one of the several branches of the arsenal from another branch are drawn by the workshop Conductor, who keeps a record of such transactions. Steam power employed in workshops which also possesses facilities for making such small castings, &c.

The Commission met at 12 noon. *Minute No. 9, dated 19th February 1874.*  
 Minute 7 read and approved. Draft letter addressed to Government altered. Questions proposed to put to Commissaries of Ordnance were read and discussed. It was also determined to request the Government of India to move the Commander-in-Chief and the Governments of Madras Bombay to obtain certain information desired by the Commission from Commanding Officers of Corps, Regiments, and Batteries.

It was resolved that the exact scope and nature of the information necessary required further discussion.



*Minute No. 10, dated 21st February 1874.*

The Commission met at the Cossipore Gun Foundry and Shell Factory at 11 A. M. They inspected the books and accounts of the Factory commencing with the forms of estimates, and examining Contractor's book, requisition books, issue and receipt books, ledger, arsenal balance sheet, &c. They discussed the question of general charges.

They subsequently inspected the Foundry and Shell Factory.



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Minute No. 10 read and approved. It was decided that the deductions which might be made in regard to the system pursued in an arsenal or factory should be noted in the Minutes, in order that a record should remain available for reference in consideration of the subject as a whole.

In discussing the system of work at Cossipore, the Commission found that a great deal was done by job or contract under the following arrangement. The rates for these contracts are first fixed by agreement between the foreman and contractor. The correctness of the rate is then tested by registering the number of days during which the contractor and his men are actually occupied on the job. A calculation is then made of the amount of their pay for that number of days according to the rate of wages paid at the time to men of the class or classes employed. Should the sum to be paid at the rate agreed on exceed or be much less than this amount + 25 p. c., the rate for the best similar job is re-adjusted. The men employed on the contract work are shown on the daily muster roll.

In considering the question of "General Charges," it was found that formerly these were made up of supervision, rent of premises + 30 p. c. on cost of the article manufactured.

At the present time a general rule is adhered to by charging cent per cent on labor only, this forming the item "General Charges." The Commission considered it to be advisable to procure the Arsenal balance sheets of the factory with a view to ascertaining exactly what items are entered therein, so as to enable some conclusion eventually to be arrived at in regard to the form which it might be desirable to follow uniformly.

With regard to the forms and books which the Commission inspected, it appeared to them useful to note that it would perhaps be desirable that in each form or book there should be a brief statement of the object of the book, the meaning and mode of filling in the columns, and the order under which the books are kept up being quoted.

It appeared that the value of tools in use formed a large item, and that when issued from store to use, such tools were "written off" and brought on the appendix ledger, and only brought back when expended as old wood or iron. It was decided that further enquiry should

Minute No. 11, dated 23rd February 1874

be made into the system followed and the nature of the check, if any, on consumption.

It appeared to the Commission that the "ticket" system as worked at Cossipore required consideration, and that the tickets should be in possession of the men, collected when they come into work, and returned to them when they leave the factory at close of the day's work. The mode of payment, as a general regulation for all factories, was also considered a point which might be discussed.

In order to consider whether Cossipore could not be made more self-supporting, the Commission considered that the first step to be taken was to ascertain what demands of the Department Public Works and other departments could be satisfied from Cossipore, utilizing the existing plant. With this view, the President stated he would product correspondence discussing the latter.

Carried out by Special Ordnance Commission, No. 37, dated 23rd February 1874, to Marine Department.

The Commission considering it advisable that they should see the Dockyard, workshops &c., and inspect the modes of work and payment, in order to ascertain the class of work done there, resolved to ask for permission to visit this establishment.

Adjourned at 2-30 p. m.

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The Commission met at the Small Arms Ammunition Factory, Dum-Dum, at 11 A. M., in charge of Captain Walker, Royal Artillery, and having inspected the books in the Superintendent's Office, visited the factory and workshops, the store-keeper's department, and inspected the books of this branch and the central office. They also inspected the laboratory.

*Minute No. 12, dated 24th February 1874.*



*Minute No. 13, dated 25th February 1874.*

Minutes Nos. 11 & 12 read and confirmed.

With reference to Minute No. 1, concerning the out-turn and requirements of the army as regards powder, it was resolved to ask Government for the statements called for in Military Department No. 503 of 16th October 1873.

Mr. Cardozo to be asked to prepare the statement for requirements of army in India.

Government to be asked on receipt of permission from Government, that His Excellency the Commander-in-Chief may be moved to cause General Officers to be informed.

To ask Public Works Department whether, if the Bengal system of storing camp equipage under regimental charge are introduced in the Madras and Bombay Presidencies, storage could be provided from existing buildings and barracks at military stations, and if any addition be required, to state the cost for each station.

As regards questions to Commanding Officers, draft letter approved, and decided that questions should stand over for further consideration.

Dum-Dum Factory now working:—

55,000 { 25,000 S. B. L. R.  
30,000 E. M. L. R.

Engines 20 H. P. @ 8 hours.

Morning report in each branch compiled in one general monthly, from which the pay rates are calculated.

Piece work put no check on rates beyond the knowledge of Woolwich rates. Superintendent does not cut down good men.

No ticket system roll called; extra men paid monthly.

In fixing month pay 24 days are taken as the number for which pay is allowed.

Noted that the Store-keeper's ledger of issues includes a record in detail of the purposes for which the stores are issued and prices the material for each job.

That the Store-keeper as a rule sends all stores to the arsenal Each branch separate books.

The Commission decided that the result of their inspection of the Dum-Dum Small Arm Ammunition Factory should be recorded in the minutes as observations or remarks, and agreed to the following being noted.

The practical result with regard to the visit of the Commission to the Small Arm Ammunition Factory at Dum-Dum, was as follows:—

Remarks to be noted on the visit of the Special Ordnance Commission to the Small Arm Ammunition Factory, Dum-Dum.

1. That the arrangements of the buildings in reference to the work to be performed in each are good, and the accommodation ample.

2. That, as regards *safety* of the Factory, there is a good substantial brick-wall all round the premises, sufficient to prevent depredations of thieves, but next to useless as a defensive work, save from an ill-armed rabble.

3. That the machinery and plant generally are perfect of their kind, and the workshops airy, well ventilated and commodious.

4. That the Superintendent is a practical, scientific, and intelligent man, who thoroughly understands his duty and is zealous in the performance of it, and that his opinion on any points which might be referred to him in connection therewith would be valuable.

5. That the machinery is well looked after and in good working order, but that only half of the steam power available is in use.

6. That the European Superintendents of sections are intelligent and trustworthy men, well up to their work.

7. That the hands present appeared to be busily employed; and not more hands engaged on any section of the work than appeared to be necessary.

8. That the materials used in the various manufacturing operations were excellent of their kind; and that partly owing to the intelligent European supervision, partly to the work being done by good machinery in good working order, and partly to the goodness of the material itself, the wastage was small.

9. That the manufactured articles were first rate of their kind.

10. That the work was carried on systematically, and without noise or confusion.

11. That the books were well kept, and the Head Clerk understood his work. But that there appeared an unusual amount of check and counter check, regarding which the necessity may exist for the reasons pointed out by the Superintendent, viz. that taking for example a Boxer Snider Cartridge, in making which there are no less than 120 separate operations, and a large variety of small parts, more check is necessary in his own



defence as custodian responsible for valuable Government property than would be required in a Gun-powder Factory for instance, in which only three main ingredients are used, which can easily be traced from stage to stage of the manufacture.

12. That as far as could be gathered from the books, the amount of the out-turn and its cost were very satisfactory, especially as regards the year 1872-73.

N. B.—In a memo. furnished by the Superintendent for the information of the Inspector General of Ordnance, the former Officer states, "In general terms it may be said that the highest daily out-turn, working 8 hours a day, is as follows:—"

Small arm ammunition of all kinds	120,000
Fuzes ... ..	300
Friction tubes ... ..	2,500

13. That with only half the available steam power working, the present daily out-turn of ball-cartridges is as follows, working 8 hours a day :—

25,000 Snider } which
30,000 Enfield }

quantities could be increased to a daily out-turn of 50,000 of each, with the same machinery and extra hands.

14. That the Superintendent stated he could at the shortest notice, supplement his present hired work-men to any necessary extent, within the limits of the working capabilities of his plant.

15. That the rates of labor for the various trades employed are as follows, for the Departments mentioned.

16. That as a matter of fact, the hired extra laborers become regular attendants, and are generally paid by the month, some of them remaining in Government employ for many years and eventually obtaining either compassionate allowance or gratuity in lieu of pension, each man's case being judged on its own merits.

17. That, as regards the question whether the European establishment for supervision, and the establishments generally for labor, are in a proper proportion to the work to be turned out, or in excess of or below that proportion, the answer can only be ascertained partly by a comparison of such out-turn and proportion with those of the corresponding Factory at Kirkee, there being no similar establishment in the Madras Presidency, and partly by the practical opinions of the two Superintendents. The Kirkee Factory having however been but a short time in full working condition, the comparison could only extend to the earlier operations of the Dum-Dum Factory for a similar length of time.

18. That so far as regards ability to supply ammunition to all India, provided the Kirkee Factory is in anything like the same working condition, or making

rapid progress thereto, there would be no difficulty in the 2 Factories turning out the requisite quantity.

19. That *Fuzes, percussion, R. L.*, can be made in the Factory so soon as the necessary plant shall have arrived from England, and that supply of this plant has received the approval of the Secretary of State for India.



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*Minute No. 14, dated 27th February 1874.*

Letter No. 1405, dated the 25th February 1874, from Secretary to Government of India, Military Department, read and reply made by letter No. 40, dated 27th February 1874. Memo. drawn up shewing what points the Commission desired to obtain information on from the Master Attendant or the Dockyard Superintendent.

The memo. was as follows :—

1st.—The nature of the work executed.

2nd.—The rates of wages.

3rd.—The system of piece or contract work if followed at the Dockyard.

4th.—The establishments of artificers, laborers, &c., whether permanent, extra, or mixed.

5th.—The nature of the supervision.

6th.—The method of keeping books, accounting for labor and material, payment of the men.

The Commission adjourned to the Dockyard at 11-30.



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Minute No. 14 read and confirmed.

*Minute No. 15, dated 2nd March 1874.*

With reference to memo. in Minute No. 14 dated 27th February 1874, the following observations were ordered to be noted on the Minutes in connection with the visit of the Commission to the Dockyard.

I.—The nature of the work executed.

There appeared to be various kinds of machinery, ship-building work, iron and wood founding, casting, &c.

Work was also done occasionally for the following Departments.

Public Works Department.

Mint.

Arsenal.

Customs Department.

Police.

Postal Department.

Court.

Port Commissioners.

Municipality.

II.—The rates of wages were noted.

In the Building Department all work is executed by contract.

III.—The system of piece or contract work.

In the Building Department the contracts are on printed rates, an average of 4 years being taken. The contractor is supplied with iron and with fuel, but has to pay for the latter and to supply labor. Carpenters' work is executed by measurement, 0-1-0 per inch of thickness per foot length, and exclusive of width.

The contract rates for sawing timber are as follows:—

Teak	1-6-0	per	100	supl.	ft.
Sissoo	2-0-0	„	„	„	„
Saul	1-4-0	„	„	„	„
Soondry	2-0-0	„	„	„	„
Pine	1-0-0	„	„	„	„

Amount of men is calculated on the experience of the foreman, and in the Building Department the wastage is allowed for according to the judgment of the builder. It was found that in converting wood from log to finish

25 per cent. must be allowed per square timber.

45 to 50 per cent. for round timber.

The prices of Moulmein teak (Messrs. McKenzie Lyall, contractors,) were as follows:—

September 1873 Rs. 120 per ton.

December 1873 „ 115 „

February 1874 „ 135 „

IV.—The number of artificers, laborers, &c., in the Factory Department is about 1,400, of whom from 600 to 800 attend daily.

In the Building-yard, the men work by gangs, a maistry bringing a certain number to each gang, and he is paid for them.

V.—In the Factory, there is 1 Civil Engineer and 3 Assistant Superintendents, over 600 to 800 men.

In the Building Department, 1 Master Builder and 2 Assistants.

VI. Method of keeping books, accounting for works, &c.

The forms in use obtained and noted for future reference.

For general charges 10 per cent. is charged on material and labor. This is supposed to include—

Supervision.

This percentage is charged to outside departments; but does not cover the cost.

Indent on plant, fuel, oil, &c., is charged as material on each job.

The cost of labor and material are about equal, and if there be any inequality, it is stated to on the side of labor.

It appeared that if any articles of supply required were not in stock, the Superintendent could order the purchase in the local market without reference to higher authorities.

It was stated that there was no difficulty in obtaining laborers.

In the payment of the men, absence other than from sickness is charged against them in the proportion of  $1\frac{1}{2}$  days' pay for 1 day's absence.

Overtime is paid for at the regular day's rate. The payment is made once in 14 days. The payment is not made until after audit by the Examiner, *i. e.* 20 to 25 days after it is due, or 10 days after submission of the accounts to the Examiner.

The system of check is as follows:—

Each trade has a marked copper ticket (thus B. M. boiler-maker) and with the man's number on it. At the gate is a box marked at the slits:

Full time  $\left\{ \begin{array}{l} \text{2nd Box} \text{ 3rd Box.} \\ \frac{1}{8} \text{ late} \quad \frac{1}{4} \text{ late.} \end{array} \right.$

and each slit is closed at the proper time. If later than  $\frac{1}{4}$ , the man gives ticket to muster check by hand. The tickets dropped into by the box are locked up in the safe, and a tin ticket is given to each man in lieu. This is returned at the close of the day, and the copper ticket is given back to the man. The time of attendance is entered in a rough muster book.

Papers received as per margin were laid before the Commission. Decided to ask for information in regard to the number of holidays at the Gun-powder Factory, Ishapore, and how the calculation of the number of working days was made.

Colonels Hatch and Stewart were asked to undertake the drawing up of statements showing—

1st.—The requirements of the Army of India.

2nd.—The manufacturing capacity of the several factories.

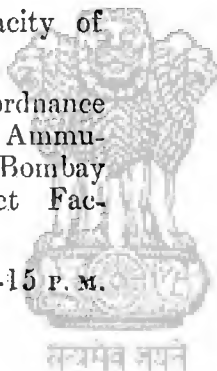
Both in regard to powder and ordnance stores made up at the Small Arm Ammunition Factories in Bengal and Bombay and the Cartridge and Bullet Factories, Madras.

The Commission adjourned at 3-15 P. M.

From Inspector-General of Ordnance and Magazines, Bombay, No. 857 of 24th February 1874.

From Agent, Gun-powder Factory, Ishapore, No. 702 of 24th February 1874.

From Inspector-General of Ordnance and Magazines, Bombay, No. 917 of 25th February 1874.



*Minute No. 16, dated 4th March 1874.*

Carried out by Special Ordnance Commission, No. 47, dated 4th March 1874, to Public Works Department.

Carried out by Special Ordnance Commission, Nos. 52, 53 and 54, dated 6th March 1874, to Inspector-General of Ordnance and Magazines, Madras, Bengal, Bombay.

Minute 15 read and confirmed.

It was decided to enquire from Public Works Department the space necessary for storing camp equipage of each battery, regiment and corps, and, further, whether information could be obtained shewing if the Bengal system of camp equipage and ammunition being in regimental charge could be adopted in Madras and Bombay, utilizing existing barrack &c., accommodation, and what the extra cost would be supposing extra accommodation be necessary. Inspector-

Bengal

General of Ordnance, Madras to be furnished with printed questions to be answered by Commissaries of Ordnance, and the replies to be sent to Secretary, Calcutta. The following were decided on.

Bombay

#### *Questions for Commissaries of Ordnance.*

1. How long have you been in the Ordnance Department, and during that period how long have you been in charge of an arsenal?

2. When were you last in charge of an arsenal, and for what period were you so?

3. What is your opinion as to the sufficiency of the present establishment of the arsenal now under you, (or of which you last had charge,) as regards officers, warrant and non-commissioned officers and native permanent establishments; and in what respect would you propose any alteration?

4. What is your experience as to the facility with which those permanent native establishments can be (or have been) supplemented by hired labor?

5. What is your opinion as to the efficiency of hired workmen, as compared with that of the permanent establishment?

6. Have you found inconvenience to arise from irregularity of attendance on the part of the men of either class; and if so, in which class has it preponderated?

7. Is (was) your establishment sufficient to admit of detaching warrant or non-commissioned officers, or lascars, in charge of stores or of small parks, without detriment to current work?

8. Are (or were) your plant and area sufficient to admit of a considerable increase to your out-turn or despatch of stores in case of necessity, by the employment of additional workmen?

9. Would your present (then) supervising establishment be (have been) able to exercise an effectual supervision over such increased numbers? If not, how would you propose to supplement the supervision for an emergent increase of work?

10. Name instances in which such extraordinary work has devolved on the arsenal, and how it was effected?

11. Furnish a statement shewing the number and designation of the separate sections, charges, or branches, as they are variously styled, into which your arsenal is (or was) divided? and the number of headings of stores in each section?

12. Has any warrant officer more than one of such charges;—if so, how many?

13. Are the store-rooms or godowns forming each charge conveniently situated, each to other; or too much scattered for effectual supervision?

14. Show the distribution of the European establishment of the arsenal, and quote the order of your department under which the distribution is made?

15. State if there be continued work in connection with each section requiring the undivided attention of the number of Europeans attached?

16. What assistance as regards supervision, European or Native, has (or had) each warrant officer in charge of stores, in the clerical and other work connected with his duties?

17. If the camp equipage and tent lascars of the regiments serving at your station were kept and repaired in the arsenal, would any, and if so how much increase to your European establishment or any additional store-room be necessary?

18. What stations are within the range of your arsenal supply?

19. How do you arrange for the despatch of stores thereto?

20 (a.) Has there been any additional delay, causing complaint, in the receipt of stores at those stations since the reduction of arsenals and magazines in 1869-70?

20 (b.) Do you receive any complaints on the subject of delay in receipt of stores at these stations?

21. What is the average interval from date of receipt by you of an authorized indent, to date of despatch of stores, and from date of such despatch to date of delivery of stores at each of the stations named above?



22. What repairs are usually executed in your arsenal for regiments, European and Native?

23. Have you the means of repairing gun-carriages, heavy and light?

24. What has been the average number of indents received into the arsenal, and acted upon during the past three years, distinguishing those for ordnance stores proper, camp equipage and barrack stores; and as regards Madras, stationery stores in addition?

The Commission adjourned till the 5th to meet at 11 A. M., at the Office of the Examiner of Ordnance Accounts.



With reference to Minute No. 16 of the 4th March 1874, the Commission recorded therein observations on their visit to the Ordnance Examiner's Office.

It appears that in the supply of timber to the Gun-carriage Factory, Fatehgarh, the contract prices at which timber is purchased at Fort William Arsenal, are not charged to the Factory. Timber is charged to the Gun-carriage Factory at Ordnance rate book prices, and not at the actual cost of purchase and carriage. The rate book prices include a percentage for transport, which is an average spread over the whole department, i. e., a percentage is charged on every article, which percentage is supposed to cover the cost of distribution to the factories and arsenals. Rate book is corrected every 7 years.

It appeared also to the Commission that the cost of carriage of timber from forest to Gun-carriage Factory, amounting in 1872-73 to Rupees 20,400, has been erroneously written off in the Timber Agency accounts to "profit and loss," and not charged to the Factory.

It further was shown that the loss on conversion or condemnation of half-wroughts was written off to "profit and loss," and not charged to the Factory.

The Timber Agency cuts down and supplies Saul and Sissoo to the Gun-carriage Factory.

In the railway transit the Company charges at factory maund weight, 30 to the ton, or  $1\frac{1}{2}$  maunds per cwt.

Iron is only charged to the Gun-carriage Factory at the prices of the rate book, which includes a percentage for freight and transport.

It was stated that the Woolwich system of accounts was introduced at Fatehgarh Gun-carriage Factory in 1868-69. The Examiner objected to it at the time as not giving auditor sufficient data. It was noted that this should be enquired into at Fatehgarh.

In 1871-72, 176 separate accounts for articles made up, and in 1869-70, 274 separate accounts for ditto were received from Fatehgarh.

The Examiner of Ordnance Accounts is also the Examiner of Dockyard Accounts. In the Marine Branch the rate book appeared to be altered annually. The Dockyard furnishes a certificate of work being done efficiently to the Examiner signed by the Foreman.

It appeared to the Commission that the system of calculating the amount of

wages from the muster roll was very complicated.

The Examiner was asked to send Special Ordnance Commission a copy of the annual account current of the Gun-carriage Factory, dated 1st April 1873, for 1872-73.

Decided to embody these observations in a memorandum, and to request the Examiner to give an explanation of the remarks made by the Commission, and of the principles and detail under which the advance rates are arrived at *e. g.*, to state in detail how the rate of Rupees 4-8-0 per c. ft. for timber, sawn teak, is arrived at.

The Commission adjourned till Monday the 9th instant, to meet at 11 A. M. at the Arsenal, Allahabad.



The Commission met at 11 A. M., at *Minute No. 18, dated 9th March 1874.*  
the Allahabad Arsenal.

Distribution statement of warrant &c.  
officers handed in.

“Morning Report” as in Fort William.

The distribution appears to be similar  
to that in Fort William, except the  
warrant officers on gate on permanent  
duty.

Four available warrant officers or non-  
commissioned officers not in charge of  
stores are told off, and relieve each other  
weekly. Warrant officers on duty out  
of working hours relieved daily.

Each store-holder keeps a report showing  
daily employment of men assigned to  
him, from which he prepares his monthly  
report.

European Assistant in Receipt Branch  
frequently sent to Railway stores, some-  
times causes inconvenience.

Statement sent to Inspector-General of  
Ordnance before end of last month of each  
quarter of extra work-men required for  
next month. Stated that there was no  
difficulty in getting extra men, but great  
competition for employment. Extra  
hands paid by monthly rates, and pun-  
ished by fines for absence without leave,  
usually  $\frac{1}{2}$  day's pay besides that of day  
of absence. The men regular in attend-  
ance. Rates always somewhat lower than  
permanent establishment—those certified  
by Civil Officers to be rates of district.

Articles made or repaired costing each  
more than 50-0-0 shewn separately in  
accounts. Those costing less are lumped  
together. Steam-power and fuel and  
supervision not charged on work.

60 pairs of bullocks from siege train  
establishment, but kept near arsenal as a  
rule, fed and cared for by the Commis-  
ariat, used in arsenal and in taking stores  
to and from railway.

Arsenal sends to Inspector-General of  
Ordnance annually statement of work  
proposed to be done in succeeding year,  
usually sent about November, but is  
occasionally called for at other times.

Each regiment has its own camp  
equipment. A reserve of 2 years' supply  
kept in arsenal, as well as unserviceable  
tents for standing camps, &c.

The books were examined.

#### *Work Report.*

Monthly return of material and labor.

*Estimate Statements.*

Estimates of supplies required, calculated by 5 years' actuals, and each following year, the left hand (year) column rejected, and the new year added for purposes of calculation. This plan commenced in 1866-67.

*Ledger.*—Office ledgers posted monthly from Receiving and Issuing Conductor's day books, which are compared weekly with store-holder's books. The office ledger is compared quarterly with those of store-holders, framed from their own day books.

*Indents.*—Register of Issuing Conductor makes out a daily statement of issues, which is sent to office.

*Indents.*—Number of indents received from 1st April 1873 to 9th March 1874, 1,263. In 1872-73, 1,239.

Monthly balance return of principal stores in stock sent to Inspector-General of Ordnance, and a quarterly return of less important stores.

The following are the sections :—

A.—Field siege park and half-wrought material.

B.—Armoury.

C.—Tools, artificers, and musters.

D.—Cloth, accounts, metals, tools, intrenching tools.

E.—Miscellaneous department. Oils, paints, packing cases, coal, charcoal and fort armament and unservicable.

F.—Ammunition and Powder Magazine.

G.—Tents.

The Commission visited the B Armoury. 30,000 stand of which 5000 Snider. About 113 men employed, of whom 25 sicklegars daily constantly cleaning, and 10 extra during the monsoon, 9 men in browning. Repairs divided into 7 heads. Men constantly employed on one job, *e. g.*, "striking up" or smoothing.

Books kept by Chief Civil Master Armourer, or his assistant, showing receipt of arms from and issue to Armoury. Native Armourers considered equal to English. Found capable of all ordinary repairs, provided there was good supervision. Up to present date 40 Armourers trained in Arsenal.

Memo. signed by A. S. placed in every box packed.

1 Godown Accountant in the Office.

In the *Armoury Department* only the indents are complied with. Books as in Fort William Arsenal.

*Indent Departments.*

Indents well up to date. Separate un-serviceable store to which every thing but arms are sent, 6 or 8 men employed daily.

Country coal, both steam and smithy, procurable at 18 Rs. per ton.

Railway Company sells Kariballi coal @ Rs. 15 per ton to its own employés.

Decided to note that a compilation of specifications for all articles made up in arsenals would be useful to show exactly amount of labor and material on each article.

The Commission adjourned at 5½ P. M.



*Minute No. 19, dated 10th March 1874.*

Minutes Nos. 17 and 18 of 5-3-74 and 9-3-74, were read and confirmed.

The Commission continued their examination of the sections of stores.

They inspected E Section, and remarked that the white rope was kept packed up in a gunny and dammered, and that it was stated that it did not deteriorate when so packed. They visited the store containing the fort armament, and A Section containing the park and half wrought material. The books were kept up as in Fort William Arsenal. The term indent is applied to external demands and requisition to demands within the arsenal.

F Section. Ammunition and powder magazines are stores only containing empty cartridges which were stored in almirahs in compartments lined with paper and dammer, and closed by circular doors luted with chalk and oil.

They then visited G Section containing camp equipage.

H. The harness and saddlery section. They were told it was not fed with grease, until it had been three years old, and then fed once annually on Major Stewart's recommendation. The harness was kept in presses. Four to six men employed and one native "store accountant."

The Commission then visited the work-yard and ranges of work-shops, and inspected the books. They found the principal ones to be the following:—

1. *Distribution Book*—Shewing the tools in possession of each artificer employed, and for which the "mistries" are responsible.

2. *Ledger Appendix*—Shewing the tools and miscellaneous stores in use in the work-yard, their condition, balance in hand, &c.

3. *Work Order Book*—Shewing the orders for work as received in the work-yard, and dates of completion of work, so arranged that any item cannot be longer than three months in hand.

4. *Estimate for labor—Artificers*—Shews an estimate for an in-coming three months' work, furnishing details of each item of work to be done, with the number of artificers required to complete each.

5. *Letter Book*—Contains copies of letters concerning work-yard.

6. *Indent Book*—Contains indents for all stores required for expenditure in the different godowns of the arsenal, showing also the purpose for which required. This book is provided with columns for

signature of issuing and receiving office. It also serves for P. C. of work-yard's indent for stores for repairs, &c.

7. *Daily Abstract of Stores*.—Shews in detail each item of stores drawn for expenditure in the several departments of the arsenal.

8. *Morning Report*.—Shews the actual number of artificers present, absent, late, and also applicants for leave.

9. *Daily Work Report*.—Shews how the different artificers are employed, and the description of work, &c.

10. *Work Report*.—Is a compilation of all works completed in arsenal work-shops during a given month, shewing in detail the labor and material expended on each item. It shows the work put in hand during the month not completed, with the labor and material expended thereon. It gives a recapitulation at the end of the number of artificers and lascars employed, (the number of working days being stated), the manner in which they were distributed, and on description of work employed. It also gives an alphabetical list of all stores expended in the arsenal during the month, accounting for each and every item of expenditure.

11. *Pass Book*.—

12. *Balance in hand*.—Shews the balance of all stores drawn for expenditure during the month.

Shews in detail the unexpended balance of all stores drawn during the month for all departments of the Arsenal.

13. *Receipt Book of stores issued from work-yard*.—Contains the names of all stores which have been sent from the work-yard, whether made, repaired, or altered, with the signature and receipt of the storeholder to whom the stores belong.

14. *List of Musters applied for*.—Contains all applications to the storeholder in charge of musters for a pattern to make any article which may appear in work order book. Should the muster not be to hand, the Commissary of Ordnance gives his orders.

15. *Report Book*.—Contains applications for instructions from P. C. of work-yard to Commissary of Ordnance, regarding workyard routine, doubts concerning a particular work or expenditure &c.

16. *Boiler and Engine Report Book*.—Contains a periodical report of examination of boiler and engines in work-yard,



showing their conditions &c., with remarks by Commissary of Ordnance.

17. *Index to Changes in Artillery Materiel.*—Contains an Index to all changes in Artillery Materiel.

18. *B. and R. M. L. Ordnance.*—Contains copies of all correspondence relating to the different changes which have been made in battery equipment in the last few years—alteration of A. P. wagons, A. G. wagons, carriages &c.

19. *O. O. Circulars.*—Circulars of Inspector-General of Ordnance.

20. *O. O. M. O.*—M. O. of Inspector-General of Ordnance.

21. *Index to O. O. C.*—Contains Index to above.

22. *Average Labor Book.*—Contains a carefully compiled statement of labor required to make, repair, or alter any article which is usually done in an arsenal's workshops.

23. *Stock report.*—Contains the number and condition of all tools &c., in use in arsenal workshops, stating dates of receipt and of becoming unserviceable &c. Stock taken periodically.

The report of work over three months' standing kept up to prevent reference being made more than three months. Emergent orders in red and ordinary in black.

24. *Report of Work over three months standing.*—Contains a list of all orders for work which have been in work order book over three months uncompleted, and which owing to a press of more important work have not been completed. With the suggestion of P. C. of workyard, and orders of Commissary of Ordnance either to be cancelled or re-ordered.

25. *Transfer statement.*—Contains a list of tools, &c., in use in workyard, which it is considered necessary to have transferred from serviceable to unserviceable as the case may be, with recommendation of Commissary of Ordnance and final orders of O. & G. O.

When stores are required in any Section for use, the workyard makes the requisitions, but this is only a book transaction, the storeholder actually getting the stores for himself.

1 Native Accountant is employed.

The Commission visited the Issues Department, and found the following books kept up:—

Indent Book.

Deficiency Book.

Regulation Book.

Monthly return of Issues.

G. T. Regulation for carriage.

Practising Account Book.

Railway Credit note.

Report Book on indents of two month's standing.

Package Book for Corps and Departments.

All indents are entered in full in the Indent Book. Each storeholder attends daily to extract what he has to supply, placing his initials against the item in the detail, acknowledging his liability to supply these stores.

The Issuing Conductor is responsible for delay in issues.

The Commission then visited Receipt Department.

All stores made up and repaired are received on stock through this department. Receives articles for breaking up, breaks them up and issues a new form, except combustible stores and arms.

One Assistant frequently employed at the railway.

The following are the books kept up:—

Rough Book of receipts.

Copy of stores received during the month.

Register of Invoices received.

Stores received by rail and Bullock train.

Abstract of conversions in the month.

Product of ditto ditto.

Abstract of ditto नयन ditto.

Packages received from Corps and Departments.

Detail of petty stores and indents to be received from contractor.

Indent Book.

Deposit Book.

Credit Note Book.

Contractor's stores failed to be supplied.

Estimate of stores to be received from Arsenals and Depôts.

Receipt and Issue Departments distribute stores, and collect them from several storeholders.

Storeholders attend Receipt and Issue Offices once a week to compare books. Noted that enquiry be made in regard to this point in other arsenals. Captain Cowie, the Commissary of Ordnance in charge, approved of the present system, and that it was more a check on accuracy than anything else.

*Minute No. 20, dated 11th March 1874.*

The Commission met at the Arsenal Office at 11 A. M. Minute No. 19 of 10th March 1874, was read and approved, with certain alterations and additions which were entered. The Commission recorded the following general observations :—

The work appears kept up to date.

The establishment appears sufficient for ordinary work.

The stores appeared to be well cared for and managed.

The Commission discussed the questions to be put to Commanding Officers, and decided to explain to them the object in calling for their evidence, viz. that as different systems of supply to the troops existed in the three Presidencies of India, the Commission wished to collect information from Commanding Officers as to their experience in the matter.

Explanation of object in taking evidence of Commanding Officers.

I. As to any difficulties experienced in procuring supplies required by the troops, owing to the remoteness of arsenals from military stations, especially in regard to emergent and unforeseen demands.

II. What transport for the sick have you in regimental charge, and how is it repaired?

III. Do you consider that the system of keeping camp equipage in regimental charge works well?

What system is established in your Regiment Battery for its inspection, preservation and repair?

IV. On what occasions and under what authority are tents in regimental charge pitched for use?

V. Do you consider that the system of keeping reserve small arm ammunition in regimental charge is a good one?

State your reasons.

VI. Can all repairs to regimental equipment, especially arms, be effected regimentally?

(For Native Infantry regiments only)  
Are the native armourers trained in arsenals found to be efficient?

VII. Have you workshops in your regiment, and are they able to effect the repairs of barrack furniture?

Do the workshops undertake to make barrack furniture?

VIII. (For artillery officers only)

Can the artificers of your battery effect all ordinary battery repairs?

Have you ever been seriously inconvenienced by the remoteness of the station from an arsenal?

The Commission visited the Siege Train.

They visited the new Gun-carriage Factory buildings.

Adjourned at 6 P. M.



*Minute No. 21, dated 12th March 1874.*

Colonel Gowan, Commanding 33rd Native Infantry.

#### QUESTIONS.

I. Whether he had experienced any difficulty in the supply of stores in consequence of the remoteness of an arsenal?

II. Whether sick carriage is in regimental charge, and if so, how repaired?

III. Whether the system of keeping camp equipage in regimental charge works well, and what are the regulations established for its inspection, preservation and repair, and also under what authority tents are pitched?

IV. Whether all repairs can be effected regimentally, especially arms, and whether native armourers are efficient when trained in arsenals?

V. Whether the system of keeping reserve ammunition in regimental charge works well, and whether it is liable to deteriorate in regimental charge?

*Minute No. 20 of 11th March 1874.* was read and confirmed. The evidence of Commanding Officers was taken as follows:—

I. No difficulty.

Stationed at Morar, and drew from Agra Magazine. There was difficulty in the rains—not with the regiment at any station more distant from a dépôt than Agra. Up to 1867, the regiment had brown leather pouches, since then black leather, which have lasted well.

II. By the Commissariat—Has two doolies—ordinarily only one in regimental charge.

III. Yes; accustomed to it for 30 years, and never found any hitch or in the field. The Quartermaster receives an allowance. Tents are pitched about five times a year.

In cold weather for general inspection, and in the rains twice. Repairs very slight. Quartermaster's allowance sufficient. Tents are not pitched for use except by a Brigade Order. A tent can be sent with a large guard—Can be sent without a special order.

Tents are condemned by a regimental board—Last tents were condemned at Morar.

Stores are annually supplied, and all regiments in district send condemned stores by one guard.

As a rule articles are condemned once a year only. Carriage is obtained from the Commissariat.

IV. Sepoys enlisted who have been trained in an arsenal. Can give no evidence on experience, but believes the system will answer, renders the regiment independent. The old armourer could not make a tumbler pin. He had also received instructions in an arsenal, but says he has not the proper tools, and that it is not contained in list of tools. Cannot get walnut wood, toes of the butt chip. When a mainspring breaks, the man must pay. The spring has to be got from an arsenal. Muzzle stoppers frequently lost on parade, owing to shrinking and falling out.

V. In Allahabad, the Magazines are good, but in Morar, they were leaky. No objection to system, and no deterioration.

I. Regiment in Bengal close to two arsenals, at Fort William, and at Allahabad.

Colonel Chippendall, c. b., Commanding 2nd Battalion 19th Regiment.

Great difficulty in obtaining supplies in barrack, but cannot positively speak as to ordnance supplies. Has been at most of the stations in Bengal, and never experienced difficulty in obtaining stores. Necessary to get authority from Calcutta to return condemned stores to arsenals.

Objects to country leather, constant boards on ammunition pouches, —inferior leather, great trouble in "getting up." It is buff sent out from England (same in Madras.) Was told that the soldier applied acid, but tried experiment, and found that it did deteriorate. Pouch belts so bad that he preferred keeping them beyond the time rather than to get new ones.

II. Indent on Commissariat. Carts to take men out for airing supplied by Ordnance Department.

III. Works very satisfactorily. In Fort William Arsenal, the regiment do not keep their tents. Repairs are estimated for and passed on contingent bills regimentally. The Commanding Officer certifies that the estimate is moderate, also that the tents are in good order.

IV. The Commanding Officer can see any tents he likes, usually twice a year. No sanction is required to pitch tents. Has to practise tent pitching. When tents required for musketry camp at Dum-Dum, no difficulty in getting them.

V. Good Magazines at Allahabad.

Approves of keeping ammunition in regimental charge.

VI. No necessity to apply to arsenals for repairs to arms or camp equipage.

VII. Regiment takes contract for barrack furniture, the repairs being made in the workshops. Cannot make furniture, as there is a difficulty in getting seasoned wood.

I. No difficulty. Commanded a Battery at Fatchgarh. No difficulty in getting stores from a distant arsenal. Has been at two camps of exercise. The reductions in Ordnance Department here have not caused any inconvenience. Indents are regularly sent in and demands foreseen.

Colonel R. O. Evans, Commanding Royal Artillery.

The second line of wagons should be kept up, if bullocks are kept up, not hired. A battery had to march with native yokes, the bullocks were so small and bad. Stores have improved.

No complaints have been received of ordnance stores. English contract harness is not equal to Cawnpore harness for use in India.\* Many complaints of English harness, the leather perished. It was not kept so well in arsenals as now.† The care taken now is satisfactory. Has a high opinion of the Cawnpore Factory, but perhaps this is due to the personal qualifications of the Superintendent.

He would like to see the factory extended.

III. A battery ought certainly to have its camp equipage. There is so much to do, that Commanding Officers should not be required to get tents from an arsenal in case of a march. The regulations of the service provide for the efficient care. It is always liable to be inspected. As a rule it is found that even in handing over camp equipage from one battery to another, there are no complaints.

See General Order No. 319 of 1873.

VIII. As to all repairs of battery equipment being effected in the battery, he thinks that the European artificers are too few, for the assistants the promotion is too slow. When a man is away at the hills, there must be some one to take his place. When in command of a battery, he made up two howitzer carriages, but cannot effect all repairs. Native artificers are paid extra out of the pocket of the Commanding Officer. The principal difficulty is in regard to collar-makers. Thinks contracts might be abolished and English system adopted.

Colonel Smith, Commanding 18th  
Bengal Cavalry.

Price of Cawnpore harness is rather too high for his regiment. The ammunition is very bad. Supplies the regiment by buying old saddles for the sake of the trees, Artillery or Cavalry saddles, and re-covers them.

The Commission adjourned to the Gun Carriage Factory buildings.

\* Leather now made up at Cawnpore is far superior to what it formerly was, and to the English harness supplied from England by contract.

† Defects more in the leather than in the stitching.

The Commission met at 11 A. M., on the 13th March 1874, at the Harness and Saddlery Factory, Cawnpore.

Minute No. 21 of 12th March 1874, was read and confirmed.

The books and system of accounts of the Factory were first examined.

The principal books &c., were as follows:—

Morning report.

Muster roll or daily report of tan-yard and currier's shop.

Muster roll or daily report for workshops.

Daily abstract of stores drawn from godowns for expenditure during month.

Monthly return of issues and expenditure.

Monthly work report, or return of expenditure of labor and material.

Stock ledger.

Arsenal accounts.

A memorandum of the system of accounts and work in the factory was handed in, and annexed.

The following observations were made: The wastage bits of leather, &c., is charged to the work done, and credit taken in the value of the article. Deterioration is not charged for.

Under the head of General Charges, supervision is charged rateably on labour, and is now from 0-7-0 to 0-8-0 on 1 Rupee of labor.

Interest is charged on plant and buildings at  $4\frac{1}{2}$  per. cent. now 4 per cent. The stock in hand which is, so to speak, kept as a military reserve for any sudden demand, is not taken into account.

The supervision is over an extensive range. Each overseer supervises on an average about 200 men, there being 5 shops and 1 foreman to each. The total establishment being about 1,000.

In addition to Europeans, of whom there are 9 in the factory, there is also native supervision, the permanent establishment being the supervisors. In the extra establishment are contractors or head of gangs employed who are responsible for the men they bring and the work done. Any amount of extra labor, both skilled and ordinary, can be procured. It and steam power ample for any increase. By additional increase to the blacksmiths and carpenter's shops, he could increase the work 50 per cent.

Minute No. 22, dated 13th March 1874.

			About.
Tannery	...	...	200
Currier's shop	...	...	120
Saddler's shop	...	...	300
Blacksmith	...	...	180
Carpenters	...	...	50
Miscellaneous work	...	...	70
About ...			920



He has 130 tannery pits capable of tanning 10,000 buffaloes and 4,000 cow-hides annually. Currier's shop can curry 15,000 of former and 6,000 of latter if required. Saddler's shop can work up to 50 per cent. more than present out-turn, but more supervision would be required and 60 more pits if the other armies had to be supplied.

The Superintendent confirmed the statement made in minute No. 19 of 10th March 1874, that new harness and saddlery did not require feeding till it had been kept in store three years. The Superintendent states to increase the out-turn, 50 per cent. would be easy, with some additions to buildings and establishments, but to supply the whole of India, considerable additions would be necessary.

Mecrut hides the largest and best, but few in India. The Agra district gives the larger supply.

All scraps of leather find a ready sale.

Stores received from Fort William Arsenal are debited at Ordnance rates. Price charged for articles is the rate of the previous year, the rates being altered each year.

The Superintendent objected to permanent establishments as being more expensive and obstructive, as regards extra men working thoroughly. The annual account has "a statement of articles manufactured, &c., during the year." The heads of columns are as follow:—

Name, number or quantity. Cost material, Cost labour, Supervision, Interest on plant and buildings, Percentage of miscellaneous material. Total—Deduct percentage realized on account of sales. Actual cost.

The Commissions then visited the liming yard, machinery shed, where they saw the fulling stocks at work, and bars for saddles cut, the tannery with bark grinding and myrabolom nut-crushing machinery. They inspected the tannery proper, curriers' shops, saddlers and harness and accoutrement maker's shops, Receipt and Issue Department, carpenters and smiths' shops.

The Commission adjourned at 4 P. M..

The Commission assembled (at Cawnpore) at 11 A. M., to take the evidence of Commanding Officers on the points enumerated in memo. of questions decided upon in Minute No. 20, dated 12th March 1874.

I. Stated that Cawnpore being conveniently situated in regard to the Allahabad Arsenal, being on the line of rail, there was no difficulty or delay in the receipt of Ordnance stores.

Was formerly in command at Jhelum. Government bullock train was not made much use of, except for small consignments, and heavy stores for country carts. The stores he saw were chiefly those passing through to the Peshawur Arsenal and were on country carts. The distance of Jhelum from its source of supply was inconvenient, though he did not remember any particular case of practical inconvenience. Jhelum was 15 or 16 marches from Ferozepore. The time occupied in receiving stores after indenting for them, was 5 or 6 weeks. Was at Mooltan in 1865-66, and recollected that there was no difficulty or delay, as stores were drawn from the magazine there.

III. Considered system of keeping camp equipage in regimental charge works well. Is available in case of emergency, and is kept thoroughly efficient.

If arsenals were widely spread, the alternative system would perhaps answer, but away from an arsenal or off a line of rail, there would be great delay. There are cases in which tents are more used by a regiment when kept in regimental charge than they would be if stored in an arsenal. Old tents might also be used for musketry camps, if camp equipage was in charge of arsenals.

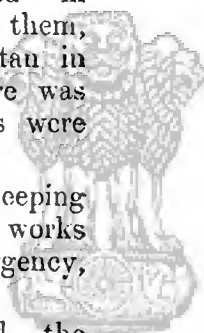
IV. Tents cannot be pitched without a station order. The rule is to take camp equipage even when regiments at stations on a line of rail relieve each other. Exchange of tents might be re-organized, though the rewould be probably grumbling.

V. At a distance from an arsenal but not otherwise any great necessity. Ammunition readily got out of an arsenal, and therefore there would be no inconvenience with regiments stationed where there was an arsenal. The regimental magazines are generally good. The storage has much improved of late years.

VI. Has heard no complaints. In the inspection of the regiment of Native Infantry at Cawnpore, the Chief Civil Master Armourer found only 1 or 2 arms

*Minute No. 23, dated 14th March 1874.*

Colonel Gordon, Bengal Infantry, Commanding the station.



Colonel G. A. Brown, Staff Corps,  
Officiating Commandant 33rd Regiment,  
Bengal Native Infantry.

defective. With a regimental armourer trained in arsenal, no difficulty should be experienced. A regiment is complete in itself, by the present system, at a day's notice if transport be provided. In some cases the camels are not quickly available, the grazing grounds are far.

VII. The supply of barrack furniture by the Public Works Department works smoothly.

I. No difficulty, and has not heard any complaints. Was 5 years at Ferozepore as Brigade-Major, and afterwards at Cawnpore. With regiments off line of rail as at Banda no difficulty or delay, as the demands are foreseen and are periodical. Stores are usually kept until they are replaced by new ones. Stores lent to regiments by or from arsenal are procured from railway station by the Commissariat.

III. Yes, at many stations absolutely necessary. A recent case in point was the sudden order for the 18th Native Infantry to move from Agra towards Rajpootana. The camp equipage could not be got quicker than transport was furnished. A regiment has so much to do when under orders to march, that it would be very inconvenient to have camp equipage in arsenals, even at stations where these existed. If might so happen that the magazine or arsenal might be closed.

IV. Camp equipage is inspected periodically by Commanding Officers. The allowance to the Quartermaster is 10 annas per pal, i. e., 25 per mensem. The allowance is ample. With this, canvas is purchased to patch the tent, "sullcetahs" kept up, &c.

The regiment has one tindal and eight tent lascars or rather store lascars, as the pitching of tents is only part of their duty. They are not trained to repair tents. The lascars take care of the ammunition and have general duties in the lines. If the tents were kept in another charge, it might be possible to reduce the number to four.

V. Under the present system, the the ammunition is well taken care of. In a military point of view, it might be advantageous to have a general station store, but it would become then a separate charge. Not so necessary to keep reserve ammunition with regiments now.

Not so necessary as to keep camp equipage. Regiments have frequent detachments, and it is usual to send a sepoy's pal with eight or ten men. If a regiment keeps even its own practice

ammunition and blank ammunition with 40 rounds of service ammunition, it would still be necessary to have a regimental magazine. A central magazine in a station, or the use of the magazines of an arsenal or dépôt desirable in a military point of view. The regimental magazine is about 10' square.

The advantage in having ammunition in charge of regiments is that the responsibility is fixed, and that it is every man's interest to have good ammunition. It might be a good arrangement to have a central magazine under British soldiers.

VI. Means of repairing everything. Armourer well instructed and capable, not enlisted, but system being gradually introduced. Capable of making tumbler pin, main spring &c., and everything connected with the rifle; although he cannot brown arms as yet for want of appliances.

Officer Commanding the 73rd Foot not examined, as the regiment had only recently arrived from Ceylon. Captain Roberts, R. A., in temporary command F-19th Royal Artillery, not examined, as he had had no experience of the Bengal Presidency, and had only recently arrived at Cawnpore from England.

The Commission adjourned till Monday, 16th instant.



*Minute No. 24, dated 16th March 1874.*

No. 1353 of 7th March 1874, from Inspector-General of Ordnance, Bombay, forwarding information in regard to cost of transport of stores.

No. 433 of 11th March 1874, from Deputy Secretary to Government of India, Public Works Department.

No. 490 of 13th March 1874, from Executive Engineer, Allahabad.

No. 718 of 12th March 1874, from Executive Engineer, Bareilly.

Papers connected with establishments of the Fatehgarh Gun Carriage Factory, sent by Government of India, with Military Department No. 1237, dated the 24th January 1874, laid before the Commission.

The Commission met at the Gun-Carriage Factory, Fatehgarh, at 11 A. M.

Minutes Nos. 22 and 23 of 13th March 1874, and 14th March 1874, were read and confirmed.

Letters as per margin laid before the Commission, ordered that the information not given in No. 433 of 11th March 1874, from Public Works Department, be applied for through the Military Department, the remaining letters to be recorded.

The Commission decided that evidence need not be obtained from Commanding Officers at Fatehgarh, no head quarters of a regiment being there stationed. The Commission proceeded to examine the books of the factory. A memorandum on the system of keeping accounts of the expenditure of wages and material was handed in by Colonel Henegan, Superintendent, read and considered—also a memorandum as to out-turn, supply of labour, and material, &c., was handed in, marked B and attached. "Statement shewing average annual cost of permanent and extra establishment, average consumption of fuel" &c., &c., handed in, and marked C. "Statement of half-wrought saul and sissoo showing percentage of loss in seasoning" handed in, marked D and attached.

The following are the books kept up in the office:—

1. Machine Ledger.
- 2.\* Half-wrought Ledger.
- 3.\* Tool Ledger.
- 4.\* Miscellaneous Ledger.
5. Allahabad new Agency Ledger.
6. Muster List Ledger.
7. Book List.
- 8.\* General Day Book.
- 9.\* Iron Day Book.
- 10.\* Half-wrought Day Book.
11. Invoice Book.
12. Estimate Book.
13. Carriage Return Book.
14. Miscellaneous Book.
15. Work Order Book.
- 16.\* Carriage Register Book.
17. Order Book.
18. Pay Book.
19. Bill Book.
20. Daily Cash Book.
21. Cash Ledger.
22. Commissariat Book.
23. Letter Register Book.

24. Monthly Return.
  25. Work Report.
  26. Receipt Book.
  27. Indent Book.
  28. Timber Departmental Book.
  29. Requisition Book, (rough.)
  30. Certificate Book, (rough.)
  31. Service Label Book.
  32. Letter Despatch Book.
  33. Index Book for letters received.
  34. Departmental Character Book.
  35. Material Ledger,
- of the above those marked are also kept by overseers and store-keepers.

With regard to the observations made in Minute No. 17 of 5th March 1874, in connection with the writing off to Profit and Loss of cost of conveyance of timber from the forest, letter No. 277, dated the 7th December 1870, from the Secretary to Government of India, Military Department, was read, by which it appeared that sanction had been given in a particular instance only, and that this practice had been continued, and this sanction had been taken to be of general application.

The Commission remarked for future comparison the peculiar form of ledger introduced by Colonel Henegan, showing receipts, issues and balance remaining on one page. This ledger is posted up every evening from the Day Book and balanced daily.

Colonel Henegan stated that he was engaged in compiling a table showing labor and material required for every article manufactured.

Tools in use were issued in the ledger. Inspection lists, &c., provides for the care and inspection of the tools in use. Sanctioned estimate from Inspector-General of Ordnance is accepted as the order for taking work in hand.

Loss by conversion or condemnation of stores included in general charges, and charged in out-turn.

With reference to Minute No. 17 of 5th March 1874, and statement of the Ordnance Examiner, that the Woolwich system of accounts had been adopted in 1868-69, it was shown that this statement was made in error. With regard to para. in statement B, there appeared to be a misapprehension of intention of certain audit remarks by Examiner of Ordnance Accounts regarding the difference in rates of certain articles

(which were explained by the then Agent Colonel Lewis), which misapprehension appeared to make the accounts unreliable in respect to the *bond fide* charges of each article.

Tools issued to branches or departments are struck off the ledger, and the value charged on out-turn.

It appears that there is a separate rate for each thickness of teak plank.



The Commission met at 11 A. M., and proceeded to visit the Gun-Carriage Factory.

*Minute No. 25, dated 17th March 1874.*

They inspected the store-room containing the half-wroughts, and remarked the plan of having a board with the name of the article painted thereon, and the quantity in chalk. At the back of the board a memo. or paper is tacked showing receipts, issues and remains. This plan obtains throughout the factory, and the quantity or number in *chalk* corresponds with the quantity or number in the Ledger balance. In the half-wrought timber stocks the number of half-wroughts in the bottom row is painted on one of the half-wroughts, and every fifth row upwards is numbered. Patterns of each article were painted red, and a board is hung on the wall giving list of articles by name with number against each. The patterns were hung or arranged and ticketed in order of these numbers with similar numbers. For want of space a great number of patterns are hung on the outside walls of the buildings.

The Commission then visited the miscellaneous store, the siege half-wroughts, general store-room, where they examined the books kept up by the store-keeper, and the field half-wrought stores. They then proceeded to the carpenter's shop, muster or pattern room, painter's shop, machinery sheds, and engine-room. The Superintendent informed them that the engine had been made up in the factory at  $\frac{1}{3}$  the English price. They visited the carriage shop containing the fitters and filers. They inspected the books of this branch. Lists were hung up showing the trade of each man employed, and also a memorandum of unfinished work.

Mr. Dane, the manager, explained that he determined the price of piece work by supervising each job personally. Men take to piece work readily. Brass and iron filings are separated by magnetic cleaning machine. The men are classified as 0-3-0, 0-4-0 men &c. He reduces the price when more machinery is introduced. The grinding machinery instead of hand-filing saves 25 per cent. The Commission visited the smith's shop, and the iron godowns. They remarked the great crowding of workmen and machinery, and that some machines are outside altogether. Timber plank is arranged according to sizes, and placed vertically at about 1" apart, retained in position by wood pegs made out of firewood. Much saving effected by recutting worn files. The charcoal stock is kept in the open (sâl)



Superintendent states that Kariballi coal is delivered at pits mouth at 3-4 per ton.

charcoal is said to improve thereby. It was stated that supplies are drawn from store monthly for work, and that this is a convenient plan. The Commission visited the Smith's Department and the Brass Foundry. After their inspection of the factory, Minute No. 24 of 16th March 1874, was read and confirmed, and the question of the method of applying percentage of general charges was discussed.

As the general charges appear to be distributed in an arbitrary and unsatisfactory manner, the Commission determine that the subject must be considered as a whole in their final proceedings.



सत्यमेव जयते

The Commission met at 11 A. M. Minute No. 26, dated 18th March 1874. Minute No. 25 of 17th March 1874 was read and confirmed.

The papers marginally quoted were laid before the Commission.

With reference to Minute No. 24 of 16th March 1874, and the papers laid before the Commission with No. 1237 of 24th January 1874, from Secretary to Government of India, Military Department, regarding proposals for an increase of establishment to the Gun Carriage Factory Fattchgarh, it was determined to record their opinion that the establishment proposed by the Inspector-General of Ordnance, in his communication No. 775K, dated the 23rd December 1873, is suitable so far as the experience of the Commission enables them to judge at present.

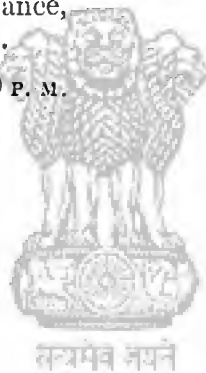
At the request of the Inspector-General of Ordnance, Bengal, the Commission note that they concur in the suitability of the temporary establishment recommended by the Inspector-General of Ordnance, Bengal, as a temporary arrangement.

The Commission adjourned at 2-30 P. M.

No. 2266 of 3rd March 1874, from Superintendent Harness and Saddlery Factory, Cawnpore, to Inspector General of Ordnance.

Statement shewing method of allotting general charges for 1872-73, at Cawnpore Harness and Saddlery Factory.

Military Department No. 725 of 13th March 1874, with enclosures.



*Minute No. 27, dated 19th March 1874.*

Minute No. 26 of 18th March 1874, was read and confirmed.

Memorandum by the President on the Gun-Carriage Factory at Allahabad was handed in, read and recorded for consideration. Also read notes by the Secretary on the military position of the Gun-Carriage buildings at Allahabad. The Commission agreed that generally the views expressed in the memo. should be adopted in making a report to Government on the question laid before the Commission with No. 323 of 6th March 1874, from Secretary to the Government of India, but that the actual report on this question should stand over until the memorandum had been copied, and each member had an opportunity of reading it.

The Commission adjourned at 1 p. m.



सत्यमेव जयते

The Commission assembled at the Ordnance Depot Office in the Fort Agra, at 11 A. M., Minute No. 27 of 19th March 1874, was read and confirmed.

They visited the park and siege train stores, camp equipage store, work-shop, receipts and issue department and magazines. They examined the various books kept up and the distribution of the establishment as per morning report.

The Commission proceeded to take the evidence of Commanding Officers.

I. Had been quartered at Morar, Rawul Pindee, Agra.

At Rawul Pindee there was great difficulty in obtaining stores, and in replacing unserviceable stores, and even in getting practice ammunition. This station was miles from an arsenal. A different system existed at Home.

In India when for example harness is marked, there is great difficulty in getting it replaced. In England a battery can get supplies at the stations where the battery may be. In India there is always delay, and especially from the necessity of sending indents to Calcutta. Harness received by one battery under his command was very inferior from having been long in store. All unserviceable harness cannot be repaired by battery, *e. g.* names, backbands. The General Officer at the station can order stores on an emergent indent. A case in point was that of a battery at Agra, having left its practice ammunition at Cawnpore for the relieving battery. It indented for a fresh supply, but has not been able to get it yet, and great delay has taken place. An instance of condemnation of harness took place at Sealkote.

III. Absolutely necessary. In regimental charge it is better taken care of than it would be in an arsenal. It would not be so likely to deteriorate in regimental charge. Naturally a small charge is better supervised than a large one.

VIII. Not entirely, *e. g.* rivets for repairing wood bottoms. Can do most repairs. Re-tire a wheel. Has not means of repairing a pipe-box.

I. No. Not aware of any difficulties. Has had most experience at frontier stations. Supplies were procured from the Peshawar arsenal. His regiment was at Abbottabad. Indents were regularly complied with, emergent indents were few; a sepoy's pal might be required, and it was at once sent. Some supplies, as accoutrements, had to be got from Ferozepore, but if there was delay, it was in these cases of no great moment. Was not aware of any instance

Minute No. 28, dated 21st March 1874.

Colonel Bent, R. A., Commanding R. A., Agra.

Brigadier-General Rothney, C. P. I., Commanding at Agra.

of the public service suffering. In case of emergency, it might of course be advantageous to be far from a base of supply. Had heard no complaint in regard to obtaining stores for the troop at Agra from the Allahabad arsenal.

III. Did not see how it would be possible for camp equipage to be kept otherwise than in regimental charge. At stations where arsenals exist, it might be possible, but such a system could not work on the frontier, or at stations away from an arsenal. Camp equipage is better cared for when kept in regimental charge. The Quartermaster is responsible to Commanding Officers. There is a strict system of inspection and repairs. Allowance to Quartermaster quite enough.

Would not advise a less proportion of camp equipage being kept up than for the whole army.

IV. No one allowed to pitch a tent except by order of the Officer Commanding the station.

V. It would be better so far as native troops are concerned to restrict reserves of small arm ammunition as far as possible. Reserves of small arm ammunition are seldom required, and it is not a wise measure, politically speaking, to have large reserves in the hands of natives. It would be preferable to have reserves of small arm ammunition in a central station, magazine, or in arsenals. Under the present system, the ammunition is well looked after.

VI. It requires more time to see how the new system works. Has had only limited experience of it. There was only one trained armourer in his former regiment. Sees no reason why it should not answer. The native armourers are good men and intelligent. Pay is sufficient to attract good men.

Colonel DeMontmorency, Commanding 59th Foot.

I. There is delay in sending indents to Calcutta. On emergent indents, stores are supplied from Allahabad. Only arrived this year in Bengal Presidency, and has had no experience of the system.

II. Yes, in regimental charge camp equipage is better looked after. Found great inconvenience when marching from Nusseerabad. Tents were issued from Ordnance Department to his regiment with broken poles, &c., and tents much damaged. Tents are kept in Quartermaster's stores, and are inspected.

III. Authority of General Officer Commanding is required to pitch them.

V. The system of keeping small arm ammunition in regimental charge is good, and prefers it to any other system. As far as the regiment is concerned, the system is a good one.

VI. Nearly everything. In fact every repair can be executed regimentally.

VII. Regimental workshops can repair and make barrack furniture, but at Agra, native labor is very cheap. At Nussereabad, native labor was very dear, and he was able to make a profit of Rupees 500 or 600, for the carpenter's shops used to do the glazing, but native contractors do it very cheaply at Agra. Would like to have the work if he could get but a small profit for the shops. Has plenty of men to employ and very good workmen.

I. The ordnance supplies for a Native Infantry Corps are low. If they were large, there might be difficulty, but in his experience had not found any. When stationed at Jhelum in the Punjab, found no difficulty. If the demand was very emergent, there might be delay, but in ordinary cantonment supplies, there was no difficulty. Could not recall any injury to the public service at stations remote from the source of supply. Was Brigade-Major at Sealkote, and never heard any complaints.

Colonel Pond, Commanding 36th Native Infantry.

III. Ought to be kept in regimental charge. Even at an arsenal station, it is better cared for, and there is less delay when in regimental charge. Quartermaster's allowance is sufficient.

II. Tents periodically inspected, and cannot be brought into use without a station order.

V. No, the small arm ammunition is safer in an Ordnance Magazine. It is now entirely under charge of natives who have received no education for the work. Is decidedly of opinion that the ammunition deteriorates from this cause. The present magazine is very small, and is filled up to the top, and ought to be double the size. Is deficient in ventilation. Would keep 60 rounds + exercising with the men. It would be an excellent plan to have a large station magazine under European charge; but it would be still better to keep it in Ordnance depôts or magazines.

VI. A regiment could repair everything, and a regiment would be entirely independent of an arsenal provided a stock of components was kept up. Native armourers are particularly clever.

Major Winson, Commanding 18th  
Native Infantry.

I. No—Had been at Gorruckpore, 120 miles from Allahabad, from which arsenal ammunition was drawn, but stores from Fort William. Sometimes there was a little delay, but merely in passing the indents, and the arsenal indents passed much quicker than in former years.

III. Yes—There would be delay if it were not so. Was suddenly ordered out lately in the Field Force for Rajapootana. Experienced no inconvenience as to stores. Extra work would have to be done by the regimental staff if the camp equipage were kept in arsenals. The late force ordered to Rajpootana was ready to move in four days, as it waited for transport for the Siege Train. But if the regiment had been by itself, the transport could have been got in one day. Quartermaster's allowance ample. Employs men other than tent lascars for the repair of tents, *i. e.*, tailors. Tents are condemned half yearly by a regimental committee. All stores that have served their time are so condemned. Those that have not, by a Special Committee, which entails trouble and correspondence.

V. The ammunition is well looked after, but it would be better if kept in an Ordnance Depot. Perhaps 60 rounds might be kept in regimental charge. The change might have a bad effect on the men.

VI. Has had little experience, but believes that everything necessary can be done. Is fully satisfied with the men trained in an arsenal.

The Commission met at 11 A. M., at the Ferozepore Arsenal, Minute No. 28 of 21st March 1874 was read and confirmed.

The Commission inspected the books of the Office. The principal ones are as follow :—

Indent book.  
Muster roll book.  
Ledger.  
Appendix ledger of stores in use.  
Pay abstract book.  
Packing account book.  
Register of indents.  
Transfer statement book.  
Work report book.  
Estimate book.

*In use in the Park Store-holder's Office.*

Return of cast-iron ordnance in the arsenal.

Ledger of stores belonging to His Excellency the Governor-General's Camp.

List of articles belonging to the Siege Train Park Book.

*In use with laboratory (in addition.)*

Yearly return of powder.

*In use in the Work-yard Office.*

Form No. 18—Indent Book.

„ 17—Order Book.

Daily closing Report.

Morning Report.

„ 21—Daily Report.

„ 35—Work Report.

Enquiry and report book.

„ 19—Daily abstract of stores from godowns.

„ 20—Ledger of tools in use.

„ 36—Transfer Statement.

List of articles made and repaired.

Form No. 4—Statement of extra artificers letter book.

„ 23—Statement of labor expended.

*In use with the Receipt Department.*

Day book of receipts.

Account Book of contractors' stores.

Account book of packages received from Bullock Train Office.

Deposit Book.



*In use with the Issue Department.*

Form No. 12—Day Book of issues.

,, 9—Register of Indents.

Index to ditto ditto.

Form No. 11—Requisition for package stores.

,, 13—Requisition for carriage.

,, 14—Packing account of stores despatched.

,, 27—Extracts from indents.

,, 7—Return of receipts.

,, 9—Indent book.

,, 10—Stores required for issue not in stock.

,, 11—Requisition on godowns.

,, 12—Return of issues.

,, 17—Order book.

,, 20—Ledger of stores in use.

,, 34—Ledger of stores issued and received from work department.

,, 36—Transfer statement.

,, 37—Report of stock.

,, 38—Statement of stock taken.  
Weekly report of stock taken by assistant storeholder.*In use with Conductor on duty.*

Form No. 15—Morning report.

Daily report of extra establishment.

Distribution of the lascars establishment.

Distribution of Government bullocks.

*In use with Store-holders.*

Form No. 7—Return of receipts.

,, 9—Indent book.

,, 10—Stores required for issue not in stock.

,, 11—Requisition on godowns.

,, 12—Return of issues.

,, 17—Order book.

,, 20—Ledger of stores in use.

,, 34—Ledger of stores issued and received from work department.

,, 36—Transfer statement.

,, 37—Report of stock.

,, 38—Statement of stock taken.  
Weekly report of stock taken by assistant storeholder.

The morning report was laid before the Commission. They noticed that one man of the extra establishment was returned as in hospital. A copy of the morning report is annexed. It was stated that the extra establishment was paid by the month, and therefore for Sundays and holidays as a rule, but with many exceptions, English supplies are received via Kurrachee on separate indents from the General Ordnance Indents, as directed in the orders of Government. Arms and other stores are received from Fort William Arsenal, this arrangement being made by Secretary of State, when freights to Kurrachee are dear.

The work of the arsenal had increased greatly in the last few years. The number of indents in succeeding years is as follows:—

1866-67	792
1867-68	831
1868-69	882
1869-70	861
1870-71	986
1871-72	1,153
1872-73	1,385
1873-74	1,500

The arsenal is divided into sections.

*Section A.*—Arms and their component parts, implements musketry, bugles, &c.

*Section B.*—Accoutrements, harness and saddlery.

Cloth, cartridges, empty.

Iron work, spirits.

Bullets, &c.

*Section C.*—Carriages, implements fuze and shell, ordnance, shot and shell wagons, &c.

*Section D.*—Ammunition cartridges filled, gun-powder and packages.

*Section E.*—Half-wrought materials, irons, oils, dry paints, intrenching tools, &c.

*Section F.*—Camp equipment, tools, planks, timbers, &c.

*Section G.*—Miscellaneous stores, gunny bags, iron and wood blocks, boilers, wood bottoms, cases, drum furniture, lead, mixed paint, pawlins, ropes, brass and iron screws, scales and weights, silk thread twine.

*Section H.*—Unserviceable stores, camp equipment and their component parts, &c.

The Commission visited the *Issue Department*. They noticed that no packing slips were placed in the packages despatched except in the case of arms.

*Deficiency Books.*

Books of store-holders are not compiled into one as at Allahabad, but sent direct to Commissary.

The Commission visited the B section. They found that on inspection of the books of the warrant officer in charge, the conductor's book showed what was issued from his store undated. His section ledger showed the issue, but on the date the stores were issued *from the arsenal*, and not from the section stores. The Commission considered that it might be better to have two columns in the day-book, date of actual issue from section store, actual issue from stock.

The ledgers are posted daily, compared monthly, and are balanced quarterly.

The Commission then visited the various other sections, the armourers' workshops, armoury, &c.

In the work-yard they visited the office, examined the work report, and found that the permanent conductor of the work-yard draws petty stores and materials as at Allahabad.

The permanent conductor stated that the extra men under him are not paid for their own holidays.

The Commission then visited sail-makers and chuckler's shops, painter's shops, carpenter's shops, wood machine room, engine-room, boiler-room, iron machine-room, blacksmith's shop, work-yard store-room, filemen's shop, steam hammer room, carpenter's shed, brazier's shed.

They afterwards visited the laboratory and magazines, and the park, siege, field trains, &c.

It appeared an excellent plan to have the yokes, stores, implements, &c., in separate compartments with each.

The following observations were ordered to be recorded with regard to their inspection of the arsenal.

That the stores appeared to be well kept and managed, the buildings appeared admirably adapted for the purposes of an arsenal, and the establishment sufficient to carry out the ordinary work.

The Commission adjourned at 5 P. M.

The Commission met at 10 A. M., Minute No. 29, dated the 24th March 1874, was read and confirmed. *Minute No. 30, dated 25th March 1874.*

With reference to Minute No. 26 of 18th March 1874, the Commission decided the following should be recorded :—

As under no circumstances can the removal of the Gun-Carriage Agency take place from Fatehgarh to Allahabad for some years, additional buildings of the most temporary and inexpensive character for the accommodation of the various machinery required for the manufacture of wrought-iron carriages are urgently and immediately required for the protection of machinery, part of which is now working in the open, and they suggest, that possibly some part of the iron-work sent out from England, intended for the buildings of the Gun-Carriage Factory, might intermediately be used for this purpose.

The sketch will shew what buildings the Gun-Carriage Agent recommends, and are in the opinion of the Commission necessary, and they venture to urge the early sanction of Government to this temporary extension of the Factory at Fatehgarh.

(The above to be addressed to the Government of India when the sketch has been received.)

The Commission took the evidence of the officer marginally noted, on the point specified in Minute No. 23 of 14th March 1874. *Colonel Drew, S. C., Commanding, Ferozepore.*

I. No, is not aware of any difficulty of supply, but has been stationed 7 years close to an arsenal at Meean Meer and Ferozepore. Was Assistant Adjutant-General of Lahore Division, and during his staff service, heard no complaints. Was not aware that troops experienced any inconvenience by being stationed at a distance from an arsenal. Heard of no complaints from troops stationed in the hills, where they were far away from an arsenal. There was a local difficulty at Ferozepore in getting Artillery blank ammunition from the arsenal, as the Commissary of Ordnance required the authority of a "Station Order" in addition to the countersignature of the Officer Commanding to the emergent indent.

III. Does not remember to have heard of any complaints of the system when he was a staff officer. At Ferozepore the camp equipage is kept in an arsenal, but believes that British and Native Regiments at Meean Meer have it. It would

be better to keep it in regimental charge. At Ferozepore, additional store-rooms would be required for camp equipage.

IV. Tents are pitched on the occasion of sickness in lines, &c., and on the authority of regimental Commanding Officers, who would however probably refer to the Officer Commanding the station.

V. The system of keeping reserve small arm ammunition in regimental magazines is a good one. Each regiment has its own magazine. At remote stations it would be impossible to keep the ammunition in magazines other than regimental. Would prefer it being kept in regimental charge, but it might be kept in an arsenal. Would keep all or none with regiments. Had no great fear as to the use Native Troops might make of the ammunition.

VI. The system of native armourers had scarcely had time for development; generally speaking, the native armourers are clever workmen.

Colonel Brown, Commanding Royal Artillery.

I. The delay in ordinary indents is about one month or six weeks; in emergent indents only two or three days.

Was stationed at Benares, and had no difficulty in getting supplies from Allahabad Arsenal.

Has heard no complaints from batteries under his command. There were no complaints at Rawul Pindee and Peshawar. The harness was now good. The last complaints he remembered had reference to *English* leather. It was in 1868, and the harness had been kept long in store. Had emollients been employed when in store, the leather would have been saved. Cawnpore harness much improved.

II. But emollients not employed in arsenals; the batteries would refuse the harness as old.

III. Yes, the system is a good one. The field battery at Ferozepore keeps its own. The tents are occasionally pitched, are examined and inspected, are as well looked after in regimental charge as they would be in an arsenal. In repairing tents, some delay occurs owing to the stages through which the application passes. There is the estimate, the Cantonment Magistrate has to give the current prices and wages, certifying to this.

The estimate is passed in Calcutta before repairs are executed, there is therefore delay.

IV. Tents are only pitched by order of Commanding Officers,

VIII. A battery is independent both in cantonment and on service. It is supplied with half-wrought material. Has not experienced any difficulty, nor had to send to an arsenal for repairs. Has been stationed at Benares, Meerut, Delhi, Umballa, Pesháwar, Rawul Pindce, &c. Cannot give an opinion on the subject of the repair of wrought-iron muzzle-loading rifled carriages.

VII. Heard that at Ferozepore the rates of labor were low, and did not think Artillery workshops could undertake barrack work.

I. No difficulty. Was stationed at Subathoo in the hills, which is 16 marches from an arsenal, and experienced no difficulty. There "emergent indents" were sent to the General of Division for counter-signature, and there was no delay. There was delay in *passing* ordinary indents sometimes. Is strongly of opinion that when the issue of stores is authorized by *regulation*, there should be no further question, and they should be issued direct from the arsenal, the demand being checked by the Commissary of Ordnance on the spot. When regulations have been laid down to guide the supply of stores to the army, the necessity for sending the indents to be passed in Calcutta is not apparent.

Colonel McKay, Commanding 2nd Battalion, 12th Foot.

If special stores, or unauthorized stores, special authority must be obtained, and in such case, the indent must be passed at the Central Office.

Another point was that very often General Orders by Government of India appeared authorizing the supply of some articles to the troops. In accordance with the order, the regiment would indent for it, and the Commissariat or Ordnance Officer would reply perhaps that this was the first he had heard of it! Probably after much delay and an immense deal of correspondence, the articles authorized would be obtained.

Cases in point were extra blankets, and the Macnamara filters. The former he had not received 18 months after the order was published. The latter he was receiving piecemeal, after great delay, and incomplete.

III. The system is good. A regiment in India is very different from a regiment at home. In India should be always prepared to move. At Ferozepore the camp equipage is kept in the arsenal. Has no store-room, and the Kallassic Establishment has been reduced. At Subathoo the tents were kept in regimental charge

but in store-rooms at Kalka at the foot of the hill, under a Kullassie. They were inspected twice a month.

When cholera appeared, he was able to move off into camp at a few hours' notice. When tents are kept in regimental charge, a regiment is able to move. It is a great thing to have a regiment independent.

V. Considered it a good thing to have small arm reserve ammunition in regimental charge. To place it in arsenals would relieve Commanding Officers of a responsibility which is a correct one, and should not be taken away from them, and the change would entail continual work and correspondence.

VI. Yes, every kind of repair to arms and equipment could be done in his regiment.

VII. Undertook repairs, and also making of barrack furniture to some extent at Subathoo. At Ferozepore the native labor is too cheap. Did some here, and could undertake repairs, but not the whole supply.

Colonel Scott, 40th Native Infantry.

I. Had only commanded the regiment while at Ferozepore. Never before had to do with Quartermaster's stores. No delay in indents. Cannot recollect any delay. Annual supplies received regularly.

III. & IV. The system of keeping camp equipage in regimental charge is certainly a good one. Care is taken of it, and it is necessary the regiment should have it in the case of an emergency. The Quartermaster's allowance is sufficient. Station Order is not required to send a tent with a guard, nor to pitch it for a hospital.

V. Where there is an arsenal, the reserve ammunition might be kept there. At an out-station, the regiment must have it. A central station magazine under a European guard would be preferable. Has no objection to the present system.

VI. Every thing can be repaired. Has two first class enlisted armourers, and is teaching sepoys.

Major Kelly, Commanding E Battery,  
8th Brigade Royal Artillery.

I. No. Was stationed at Saugor which was quite cut off during the rains. This of course caused unavoidable local delay from the fact of the road being impassable. There was no delay in complying with requisitions.

III. & IV. The tents of his battery are always in regimental charge. They are periodically pitched, inspected and

repaired. They are not brought into use except by a Station Order.

VII. The battery artificers can effect all ordinary repairs perfectly well. Never experienced any difficulty in regard to the remoteness of an arsenal. The artificers are competent to execute all repairs, and could do more work than at present. Has a singularly good set of men, but cannot speak as to repairing wrought-iron carriages. Marched from Saugor to Ferozepore over a rough country, and experienced no difficulty.

VIII. At Saugor his workshops did the whole of the manufacture and repair of the barrack furniture. Even made filth carts. But labour got cheaper, and the rates were depreciated year by year.

The Commission considered and agreed on the report to be made to Government in regard to the Allahabad Factory. The Commission having concluded their inspection of Ferozepore Arsenal, decided that it is unnecessary to visit any other establishments of the Bengal Ordnance Department, as they have found that the supplies of the army are efficiently performed, that practical uniformity of system in the Ordnance Department exists, and that the work is kept up to date. In accordance with the permission of Government given in No. 81, dated the 3rd March 1874, from Secretary to Government of India, Military Department, Colonel Hatch will proceed to rejoin his appointment, and the remainder of the Commission resolved to adjourn to Calcutta.



*Minute No. 31, dated 7th April 1874.*

From Inspector-General of Ordnance and Magazines, No. 3612, dated the 19th February 1874.

From Agent for Gun-powder, Ishapore, No. 735, dated the 5th March 1874.

From Examiner of Ordnance Accounts, No. 8532, dated the 6th March 1874.

From Military Department, No. 732, dated the 13th March 1874.

From Inspector-General of Ordnance and Magazines, No. 1806, dated the 24th March 1874.

Carried out by Special Ordnance Commission, No. 69, dated 10th April 1874, to Military Department.

Carried out by Special Ordnance Commission, No. 68, dated 10th April 1874, to Military Department.

The Commission with the exception of Colonel W. S. Hatch, (proceeded to Bombay,) met at 12 noon. Military Department, Calcutta, Minute No. 30, dated 25th March 1874, was read and confirmed.

The marginally noted communications were laid before the Commission.

With reference to the report mentioned in Minute No. 30, dated 25th March 1874, in regard to the temporary buildings required for the Gun-Carriage Agency, Fatehgarh, No. 19N, dated the 7th April, from the Inspector-General of Ordnance, with sketch of proposed temporary buildings, was laid before the Commission, and was ordered to be forwarded to Government with report in Minute No. 30, dated 25th March 1874. The Commission decide that the report on the Allahabad Factory requires verbal alteration, and directed it to be printed.

Copy of last and the present Minute to be forwarded to Colonel Hatch.

Report of return to be made to Government that Colonels Hatch and Stewart rejoin their respective appointments, and that the remaining Members of the Commission propose to meet from time to time, and consider the reports and returns which may be received.

They decide that they will probably meet at some stations in the Bombay Presidency at the beginning of July.



The Commission met at 10-30 A. M. Drafts\* of the marginally noted letters were laid before the Commission and approved. Marginally noted correspondence received was also laid before the Commission.

The Commission discussed the papers received in connection with the Powder and Small Arms Ammunition Factories, and the requirements of the Army. With reference to Minute No. 2 of 10th February 1874, the Secretary was empowered to obtain a good clerk to aid in the preparation of the tabulated statements, &c.

The Commission adjourned at 2 P. M.

*Minute No. 32, dated 21st April 1874.*

\* To Public Works Department, No. 72, dated the 20th April 1874.

To Inspector-General of Ordnance and Magazines, Bombay, No. 74, dated 21st April 1874.

To Military Department, No. 75, dated 28th April 1874.

† From Commissary of Ordnance, No. 5301M, dated 24th March 1874.

From Public Works Department, No. 841, dated 31st March 1874.

From Public Works Department, Sauror Division, No. 432, dated 24th March 1874.

From Public Works Department, Rawul Pindoo Division, No. 443, dated 23rd March 1874.

From Commissary of Ordnance, No. dated 31st March 1874.

From Inspector-General of Ordnance and Magazines, No. 20M, dated 8th April 1874.

From Inspector-General of Ordnance and Magazines, No. 34N, dated 7th April 1874.

From Inspector-General of Ordnance and Magazines, No. 19N, dated 7th April 1874.

From Military Department, No. 528, dated 11th April 1874.

From Inspector-General of Ordnance and Magazines, No. 64N, dated 9th April 1874.

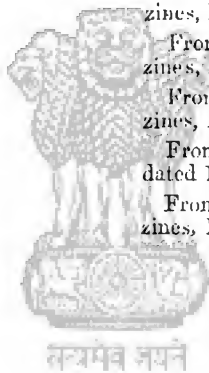
From Inspector-General of Ordnance and Magazines, No. 42M, dated 14th April 1874.

From Inspector-General of Ordnance and Magazines, No. 134N, dated 16th April 1874.

From Inspector-General of Ordnance and Magazines, No. 57M, dated 17th April 1874.

From Public Works Department, No. 610B-M, dated 18th April 1874.

From Inspector-General of Ordnance and Magazines, No. 2247, dated 14th April 1874.



*Minute No. 33, dated 29th April 1874.*

\* No. 1390, dated 27th April 1874.

Carried out by Special Ordnance Commission, No. 77, dated 7th May 1874. To Inspector-General of Ordnance and Magazines, Bengal.

Carried out by Special Ordnance Commission, No. 89, dated 19th May 1874. To Inspector-General of Ordnance and Magazines, Madras.

The Commission met at 10-30 A. M. Minute No. 32 of 21st April 1874, was read and confirmed. Marginally noted communication\* from Military Department, forwarding papers relating to the removal of the arsenal and ordnance establishments of Madras, were laid before the Commission.

Papers compiled from returns received relating to the supply of ammunition were laid before the Commission. With regard to II, the Commission directed blank Snider cartridges to be added. The figures of each statement to be corrected by Inspector-General of Ordnance of each Presidency.

No. IV. To be corrected if necessary by the budget.

VI. Number of store transactions. Inspector-General of Ordnance, Bengal, to be asked for similar statement from Dum-Dum during 1872-73, and what the Superintendent understands by the word "conversion."

VII. The papers received with Inspector-General of Ordnance, Bombay, No. 1353 of 7th March 1874, shewing freight from England to Bombay, were handed to Mr. Haliburton for examination.

VIII. No information having been given from Bombay as to the cost of transport from Small Arm Ammunition Factory (or Poona Arsenal) to arsenals, magazines and depôts, it was decided to obtain this privately from the Controller, and the papers were handed to Mr. Haliburton for this purpose. The Secretary brought to notice that the Examiner of Ordnance Accounts, Bombay, stated that he was unable to give information as to cost of transport of stores from each arsenal, &c., to each military station dependent thereon.

To the statements I—IV "cost of principal items, local supplies" to be added.

It was determined to call for a return from Madras and Bombay, shewing—

I. Store establishments and transactions of each arsenal, &c.

II. Work transactions, &c., of each arsenal on forms similar to the returns drawn up by the President and laid by him before the Commission.

The Commission adjourned at 12-30

P. M.

The Commission met at 10-30 A. M.

The marginally noted papers were laid before the Commission.

Reply to be made in regard to No. 1544 of 29th April 1874, that as the subject seems connected intimately with the report called for in No. 160 of 4th May 1874, the Commission will defer reporting.

With reference to Military Department No. 160 of 4th May 1874, regarding warrant officers in manufacturing establishments, the Commission determine, after considering the papers, to draw up a report and send to Bombay and Madras for concurrence. With reference to No. 250\* of 5th May 1874, a draft agreed upon to be addresssed to Government and copies to Colonels Hatch and Stewart, also to add that Government will move Governors of Madras and Bombay to beg Commanders-in-Chief to give every assistance.

Papers &c. regarding the Gun-Carriage Factories of India were laid before the Commission by the Secretary, and discussed.

The Commission adjourned at 1-30 P. M.

*Minute No. 34, dated 7th May 1874.*

Carried out by Special Ordnance Commission, No. 100, dated 29th May 1874.

*Issues.*

To Military Department, No. 76; dated 5th May 1874.

*Receipts.*

From Military Department, No. 1544, dated 29th April 1874.

From Military Department, No. 160, dated 4th May 1874.

From Military Department, No. 250, dated 5th May 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 2671, dated 2nd May 1874.

Carried out by Special Ordnance Commission No. 78, dated 12th May 1874.

\*Carried out by Special Ordnance Commission, No. 78, dated 12th May 1874. To Military Department, Nos. 79 & 80. Copies to Colonels Hatch and Stewart.



*Minute No. 35, dated 13th May 1874.*

*Issues.*

To Inspector-General of Ordnance, Bengal, No. 77, dated 7th May 1874.

To Military Department, No. 78, dated 12th May 1874.

*Receipts.*

From Public Works Department, No. 703B-M, dated 4th May 1874.

Minute No. 34 of 7th May 1874, was read and confirmed.

Marginally noted papers were laid before the Commission.

The Secretary explained what was being done in regard to the preparation of map.

The forms to be sent to Madras and Bombay showing store transactions were handed in by the President. It was agreed that, in the preparation of the memoranda regarding the factories &c., required by the Commission, the information should embrace that afforded by the Minutes. The Commission discussed the form which the memoranda on harness and saddlery and camp equipage should take.

The Commission adjourned at 1 p. m.



The Commission met at 10-30 A. M.

Marginally noted correspondence was laid before the Commission.

Proposed reply to Public Works Department No. 90, (a) dated 20th May 1874, laid before the Commission, and approved after alteration.

With reference to Military Department No. 1156 of 19th May 1874, copies of correspondence to go to Colonels Hatch and Stewart, with an intimation that it is proposed to leave Calcutta about 15th July, and proceed via Madras.

Memorandum on the question regarding pay and position of warrant officers, manufacturing departments, referred to the Commission in Military Department No. 160 of 4th May 1874, was laid before the Commission by Mr. Haliburton, and handed over to the President for perusal and subsequent transmission to Colonels Hatch and Stewart.

The Commission adjourned at 1 P. M.

Minute No. 36, dated 20th May 1874.

#### *Issues.*

To Military Department No. 81, dated 18th May 1874.

To Inspector-General of Ordnance and Magazines, Madras, Nos. 82-83, dated 18th May 1874.

To Inspector-General of Ordnance and Magazines, Bombay, Nos. 84-85, dated 19th May 1874.

To Assistant Surgeon-General, No. 86, dated 19th May 1874.

Telegram\* to Inspector-General of Ordnance, and Magazines, Madras, Nos. 87-88, dated 19th May 1874.

To Inspector-General of Ordnance and Magazines, Madras, No. 89, dated 19th May 1874.

#### *Receipts.*

From Inspector-General of Ordnance and Magazines, Bengal, No. 142M, dated 18th May 1874.

From Military Department, No. 1166, dated 19th May 1874.

Carried out by Special Ordnance Commission, No. 78, dated 12th May 1874. To Military Department, Nos. 79 & 80. To Colonels Hatch and Stewart.

(a) Subsequently cancelled, Colonel Crommelin having personally promised to forward the required plans.



*Minute No. 37, dated 28th May 1874.*

*Issues.*

To Inspector-General of Ordnance and Magazines, Bombay, No. 91 of 22nd May 1874.

To Inspector-General of Ordnance and Magazines, Bombay, No. 92 of 22nd May 1874.

To Inspector-General of Ordnance and Magazines, Bengal  
Madras, Nos. 93-95 of 22nd May 1874.  
Bombay

*Receipts.*

From Inspector-General of Ordnance and Magazines, Bengal, No. 175M of 20th May 1874.

Demi-Official from Controller of Military Accounts, Poona, through Mr. Haliburton.

Telegram No. 284 of 26th May 1874, from Colonel Stewart.

\* Carried out by Special Ordnance Commission No. 98, dated 29th May 1874. To Inspector-General of Ordnance and Magazines, Bengal.

Carried out by Special Ordnance Commission, No. 99, dated 30th May 1874. To Military Department.

The Commission met at 10-30 A. M.

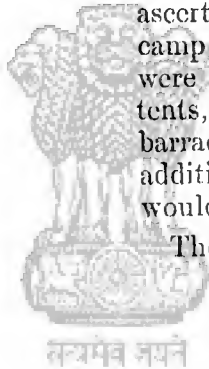
Minute No. 36 of 20th May 1874, was read and confirmed.

The marginally noted correspondence was laid before the Commission. Memorandum on the supply of harness, saddlery and accoutrements, drawn up by the Secretary from information obtained on the spot, and recorded in the Minutes, was laid before Commission.

\* It was decided to ask the Superintendent of the Harness and Saddlery Factory as to what reduction would be made in the prices of articles manufactured, should the supply of the armies of Madras and Bombay be made from the factory. Papers regarding the supply of camp equipage were discussed, and the headings of a memorandum to be drawn up were agreed on.

It was decided to address the Government of India, asking them to move the Governments of Madras and Bombay to ascertain whether, if the system of having camp equipage in regimental charge, were extended to those Presidencies, the tents, &c., could be stored in the existing barrack accommodation, and if not, what additional buildings and expenditure would be absolutely required.

The Commission adjourned at 1 P. M.



Minute No. 37 of 28th May 1874, was read and confirmed.

The marginally noted correspondence was laid before the Commission.

Papers connected with the system of supply of camp equipage were discussed.

The question of the storage of service ammunition in regimental charge, in artillery magazines, was discussed, and it was decided to endeavour to obtain information as to the space required for the storage of 160 rounds per Infantry soldier of Snider ammunition at each station in the Bengal Presidency, and the cost of the buildings required.

The Commission adjourned at 12-30.

*Minute No. 38, dated 5th June 1874.*

*Issues.*

To Colonels Hatch and Stewart, Nos. 96-97, dated 29th May 1874.

To Inspector-General of Ordnance and Magazines, Bengal, No. 98, dated 29th May 1874.

To Military Department, No. 100, dated 29th May 1874.

To Public Works Department, No. 101, dated 1st June 1874.

To Pay Examiner, No. 102, dated 2nd June 1874.

*Receipts.*

From Assistant Surveyor-General, No. 190M, dated 27th May 1874.

From Military Department, No. 1617, dated 29th May 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3216, dated 27th May 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3250, dated 29th May 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3261, dated 29th May 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3262, dated 29th May 1874.

From Public Works Department, No. 895B-M, dated 1st June 1874.





Minute No. 39, dated 11th June 1874.

#### Issues.

To Pay Examiner, No. 103, dated 5th June 1874.

To Post-master, Calcutta, No. 104, dated 5th June 1874.

To Inspector-General of Ordnance and Magazines, Poona, No. 105, dated 9th June 1874.

#### Receipts.

From Inspector-General of Ordnance and Magazines, Madras, No. 870, dated 28th May 1874.

From Pay Examiner, No.  $\frac{\text{Staff}}{228}$  dated 2nd June 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 839, dated 27th May 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5713, dated 14th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5714, dated 14th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5745, dated 17th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5766, dated 18th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5767, dated 18th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5819, dated 19th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5958, dated 27th March 1874.

From Inspector-General of Ordnance and Magazines, Madras, No. 5962, dated 27th March 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3410, dated 5th June 1874.

From Inspector-General of Ordnance and Magazines, Poona, No. 3289, dated 1st June 1874.

\* Carried out by Special Ordnance Commission, No. 110, dated 17th June 1874. To Inspector-General of Ordnance and Magazines, Madras.

† Carried out by Special Ordnance Commission, Examiner of Nos. 110-13, dated 17th June 1874, to Inspector-General of Ordnance and Magazines, Madras.

Ordnance Accounts.

Inspector-General of Ordnance and Magazines, Madras.

‡ Carried out by Special Ordnance Commission, No. 106, dated 13th June 1874. To Inspector-General of Ordnance and Magazines, Poona.

The Commission met at 10-30 A. M.

Statement drawn up in regard to pay and position of Master Refiner at the gun-powder factories in the three presidencies, and the Secretary was requested to obtain information as to how the salary was fixed for the Master Refiner at the Kirkee Factory.

Statement of cost of establishment, purchase and repairs of camp equipage handed in by Mr. Haliburton.

Marginally noted correspondence was laid before the Commission.

It was decided to ask Inspector-General of Ordnance and Magazines, Madras, for the proportion of camp equipage kept up to the strength of the Army, and as to what reserve was sanctioned.

As from the statement furnished by Mr. Haliburton, it appears that the average cost for repairs of tents &c. in Madras was for 1870-71—1871-72 Rupees 967.

\* Inspector-General of Ordnance and Magazines to be asked whether that represents the total amount expended for repairs in Ordnance Department and in regiments, and whether it includes both labor and materials.

† Inspectors-General of Ordnance and Magazines of the three presidencies to be asked the exact cost of a single set of universal saddlery, including freight and all charges, and lead harness, and how the rates are arrived at.

‡ Reply made to Bombay Inspector-General of Ordnance's No. 3289, dated 1st June 1874, that as the Commission will be able to avail themselves of Colonel Worgan's assistance at Poona and Bombay, they do not wish to put him to the inconvenience of meeting them at the out-stations.

In reference to the report called for on the pay and position of the Master Refiners of the Powder Factories in the three presidencies, called for in Military Department No. 425 of the 8th May 1874, the Secretary was requested to draw up a draft report embodying the following views:—

That the present pay at Ishapore and Madras is inadequate to the duties and training required, and should be increased by raising the staff salary from Rupees 30 to Rupees 60.

That the duties of the preparation of fulminate of mercury, and the analysis required in the Gun-powder Factory

appear now to be quite separate, and that according to letter No. 104 of 30th May 1874, from Superintendent Ammunition Factory, to the Inspector-General of Ordnance and Magazines, Bombay, a Serjeant Overseer is employed on the former duty; that consequently they see no reason why the analyst at the Kirkee Factory should be of higher rank and position to those of the other presidencies.

They accordingly recommended that an Assistant Apothecary should be sent from the Bombay Ordnance Department if he cannot be instructed in Bombay, to Madras or Ishapore, for instructions, and the Sub-Assistant Surgeon dispensed with.

If no man is available from Bombay Medical Department, that one should be trained and sent from Bengal or Madras.

The Commission adjourned at 1 P. M.



*Minute No. 40, dated 18th June 1874.*

\*Carried out by Special Ordnance Commission, No. 118, dated 24th June 1874, to Military Department.

*Issues.*

To Inspector-General of Ordnance and Magazines, Poona, No. 106, dated 13th June 1874, informing him that his presence will not be required at the distant out-stations.

To Colonels Hatch and Stewart, No. 107, dated 13th June 1874.

Copy of the above forwarded for concurrence.

To Assistant Surveyor-General, No. 108, dated 15th June 1874, asking for copies of map of India.

To Inspector-General of Ordnance and Magazines, Poona, No. 109, dated 16th June 1874, asking why the rates for the Gun-powder Factory and Small Arms Ammunition Factory have not been entered in the statement.

To Inspector-General of Ordnance and Magazines, Madras, No. 110, dated 17th June 1874, regarding the average cost for repair of tents, &c., in Madras Presidency.

To Examiner of Ordnance Accounts and Inspector-General of Ordnance and Magazines, Madras, Bombay, Nos. 111-13, dated 17th June 1874, asking for the total cost of a single set of universal saddlery, including freight and all charges, &c. &c.

*Receipts.*

From Inspector-General of Ordnance and Magazines, Madras, Nos. 1087, dated 10th June 1874--Affords information relative to harness and saddlery.

†Carried out by Special Ordnance Commission Nos. 116 and 117, dated 23rd June 1874, to Colonels Hatch and Stewart.

‡Carried out by Special Ordnance Commission Nos. 118 and 119, dated 24th June 1874.

To Inspector-General, Military Works, No. 120, Public Works Department.

The Commission met at 10-30 A. M.

Minute No. 39, of 11th June 1874, was read and confirmed.

\*It was decided to ask for the services of the Secretary to be placed wholly at the disposal of the Commission from the 1st July 1874.

The Commission having understood that the Master Refiner of the Kirkee Powder Factory was about to visit Madras and Calcutta to be instructed, resolve to address a preliminary letter to Government, suggesting that the visit should be postponed pending the report of the Commission on this special appointment. Letter No. 114, dated the 18th June 1874, was drafted and approved, and a copy was ordered to be sent to Colonels Hatch and Stewart.

†The Secretary submitted a draft report on the question as to the pay, &c., of the Master Refiner at Ishapore, referred to the Commission by Government in Military Department No. 425 of 8th May 1874, and embodying the views recorded in Minute No. 39. The draft was approved, and directed to be sent to Colonels Hatch and Stewart.

‡In reference to the question as to the storage of ammunition, Colonel Crommelin to be asked for the standard plan of Magazines for a Battery of Artillery, Regiments of British and Native Infantry, and to find out the number of stations in India where new magazines would have to be built, were the ammunition placed in charge of the Artillery.

The Commission adjourned at 1½ P. M.

The Commission met at 10-30 A. M.

Minute No. 40 of 18th June 1874, was read and confirmed.

Marginally noted correspondence was laid before the Commission.

With regard to Inspector-General of Ordnance and Magazines' No. 271M of the 18th June 1874, information as to the cost of accoutrements was directed to be obtained from Madras and Bombay.

The Commission discussed the rates at which ordnance stores are issued to troops, to departments, &c., and the present rules obtaining in India, and compared the prices in the Indian and Woolwich Vocabularies. It appeared to ask the Commission that the Indian Vocabulary rate was the English rate. Balance sheet No. 2.

To this rate 10 per cent. is added for freight &c., of the stores from England. Rate + 10 per cent. to the stock book rate in Bengal.

An additional 10 per cent. is added for transport, and is charged on issues to other departments and individuals.

It further appeared to the Commission that according to the rules laid down at the beginning of the small edition of the Woolwich Vocabulary, that the Indian Store Department is charged No. 2 Balance sheet + 5 per cent. War Office Department charges.

The following general conclusions were arrived at, and to be recommended for adoption.

#### *Europe Stores.*

*i. e.*—Those imported from England.

To be issued to troops at English Vocabulary rates—Balance sheet No. 1.

The value to be recorded in stock books, *i. e.* the ordnance rate will be the vocabulary rates (or English cost price + the cost of delivery at port say 10 per cent. The average to be revised every year.

Stock-book rates + transport charges from port to issuing arsenal, with departmental charge of 5 per cent.

(? As to latter.)

Stock book rate + cost of delivery from port to issuing arsenal + 5 per cent. or 10 per cent. departmental charges.

Stock book rate + cost of transport from port to factory.

*Minute No. 41, dated 25th June 1874.*

To Military Department, No. 114 of 18th June 1874, about the visit to Calcutta and Madras of Sub-Assistant-Surgeon employed as Master Refiner at the Gun-powder Factory, Kirkee.

To Military Department No. 215 of 19th June 1874, regarding the services of the Secretary to be placed wholly at disposal of Commission.

To Colonels Hatch and Stewart, Nos. 116-17 dated 23rd June 1874, Question of the pay recommended for the Master Refiner, Ishapore.

To Inspector-General, Military Works, No. 118, dated 24th June 1874, asking for papers showing the system of supply of barrack furniture to the army in the Bengal Presidency.

To Inspector-General Military Works, No. 119, dated 24th June 1874, asking for 2 copies of standard plans of Regimental Magazines for a Field Battery and a Regiment of British and Native Infantry, &c. &c.

To Public Works Department, No. 120, dated 24th June 1874, asking for information in regard to the regimental magazines of the stores of the Madras and Bombay Presidencies.

#### *Receipts.*

From Government of Madras, No. 1003 M-N, dated 3rd June 1874, regarding the requisition of the Special Ordnance Commission for plans of certain Military Stores, Arsenals, Magazines and Factories.

From Inspector-General of Ordnance and Magazines, Bengal, No. 269M, dated 18th June 1874. Increase of wages of the Native workmen employed in the Gun-powder Factory, Ishapore.

From Inspector-General of Ordnance and Magazines, Bengal, No. 271M, dated 18th June 1874, Supply of Harness and Saddlery and leather equipment for the armies of Madras and Bombay.

From Inspector-General of Ordnance and Magazines, Bengal, No. 752N, dated 20th June 1874, Statement showing the number of wooden gun carriages and wagons issued to Batteries and regiments during the past three years.

Ordnance rates.

*i. e.* Balance sheet No. 2 + 5 per cent.

Charge to other Government Departments.

Issue to sales to individuals or Native States.

Issue to Ordnance Factories.

	Local supplies including Europe stores purchased locally.
Issues to troops.	At contract rates not exceeding vocabulary rates.
Stock Book.	Contract rates.
To other Government Departments.	Stock book rate (+for provincial services, a departmental charge of 5 per cent.)+transport to the issuing arsenal if received from another station.
To sale to individuals and Native States.	Stock book rate+departmental charge of 5 per cent, or 10 per cent. +cost of transport to issuing arsenal if received from another station.
To Ordnance Factories.	Ditto ditto less departmental charge.
	All charges of transport from issuing arsenal to be borne by the individual supplied.
	The Commission adjourned at 1 P. M.



The Commission met at 10-30 A. M.

Minute No. 41 of 25th June 1874, was read and confirmed.

The marginally noted correspondence was laid before the Commission.

In connection with the discussion as to Ordnance rates, &c., for stores, Minute No. 17 was referred to, and it was decided that any action on that Minute was unnecessary, as the points noted had been explained at Fatchghar and subsequently.

The Commission discussed the question of the price of harness, saddlery and accoutrements in the three presidencies, and with reference to Inspector-General of Ordnance and Magazines, Bombay, No. 3911, dated the 23rd June 1874, and previous correspondence, the President proposed to obtain from the Ordnance Office, a Statement according to the new nomenclature, showing the latest prices in Bengal for the articles turned out at the Cawnpore Factory.

The Secretary proposed to obtain from the Military Department the services of Mr. Orr as clerk to the Commission on a salary of Rs. 150 per mensem, with deputation allowance according to military rules, viz. 50 per cent. This was agreed to.

It was decided to ask the Sanitary Commissioner for any statistical information he may have as to the comparative nature of the climates of Bombay, Poona, Kirkee, Madras, Allahabad, and Fatchghar, in reference to the alleged unsuitability of Bombay and Madras for the manufacture of gun-carriages.

The Inspector-General of Ordnance and Magazines, Bombay, to be asked to state the nature and extent of the work performed in connection with the supply and maintenance of barrack furniture.

Also as to the extent of the work devolving on the Grand Arsenal in connection with the duty of landing stores for the Telegraph and other departments.

Information to be asked for as to the extent and nature of the reserves maintained for the naval squadron, Her Majesty's troop-ships, and the Bombay Marine.

*Minute No. 42, dated 2nd July 1874.*

*Receipts.*

From Military Department, No. 1278, dated 24th June 1874, regarding entertainment of an additional establishment for the Gun-Carriage Agency at Fatchghar.

From Inspector-General of Ordnance and Magazines, Poona, No. 3911, dated 23rd June 1874.—Requirements in Harness and Saddlery in the Grand Arsenal, Bombay.

From Inspector-General of Ordnance and Magazines, Poona, No. 371, dated 25th June 1874.—Rates for the Gun-powder and Smooth Bore Ammunition Factories, Bombay Presidency.

Telegram from Colonel W. S. Hatch, No. 8724, dated 29th June 1874.—I concur.

From Inspector-General of Ordnance and Magazines, Poona, No. 4003, dated 26th June 1874.—Regarding Master Refiner in the Gun-powder Factory, Kirkee.

From Military Department, No. 55, dated 1st July 1874, placing services of Secretary wholly at the disposal of the Commission from 1st July.

*Minute No. 43, dated 7th July 1874.*

*Issues.*

To Inspector-General of Ordnance and Magazines, Bombay, No. 122, dated 3rd July 1874, regarding store transactions of the Ordnance Department, Bombay.

To Inspector-General of Ordnance and Magazines, Bombay, No. 123, dated 3rd July 1874—Supply of barrack furniture.

To Inspectors General of Ordnance and Magazines,  
 Madras, 124  
 Bombay, Nos. 125, dated 4th July 1874.  
 Bengal, 125A

*Movements of the Commission.*

To Inspector-General of Ordnance and Magazines, Bombay, No. 126, dated 4th July 1874—Supply of stores to the Naval Squadron, Her Majesty's troop-ship, and the Bombay Marine.

To Inspector-General of Ordnance and Magazines, Bombay, No. 127, dated 4th July 1874—Receipt and delivery by the Grand Arsenal, Bombay, of stores for the Telegraph and other Departments.

To Sanitary Commissioner, No. 128, dated 4th July 1874, regarding condition of climate at Bombay, Poona or Kirkee, Madras, Allahabad and Fatehghar in regard to the manufacture of Gun-carriages and the seasoning of wood.

The Commission met at 10-30 A. M.

Minute No. 42 of the 2nd July 1874, was read and confirmed.

The Secretary explained what was being done about the maps.

It was decided to revise the questions for Commanding Officers at the next meeting.

The marginally noted correspondence was laid before the Commission.

The President laid before the Commission statements shewing the work done and store transactions of the arsenals and depôts of the Ordnance Department, Bengal, and also statements supporting the abstract.

Similar forms to be sent to Madras and Bombay.

It was decided that the areas for storage and other accommodation in arsenals &c. should be asked for from Madras and Bombay, *i. e.*—

Store-rooms.

Office.

Issue and Receipt.

Armoury.

Laboratory.

Magazines.

Workshops.

Gun-shed.

The Commission adjourned at 11-30 A. M.

Exd. P. C. Mookerjee.

*Minute No. 44, dated 10th July 1874.*

*Receipts.*

Inspector-General of Ordnance and Magazines, Bengal, No. 2964, dated 7th July 1874, forwarding certain books and papers asked for demi-officially, dated 7th July 1874.

Inspector-General of Ordnance and Magazines, Bengal, No. 385M, dated 6th July 1874, forwarding certain statements.

Sanitary Commissioner's No. 345, dated 8th July 1874.

Information regarding climatic condition of certain stations not available.

Inspector-General of Ordnance and Magazines, Bengal, No. 371K, dated 8th July 1874, forwarding replies of Commissaries of Ordnance to questions sent with No. 52, dated — March 1874.

Examiner, Ordnance Accounts, No. 2201, dated 8th July 1874, forwarding statements shewing the exact cost of a single set of universal saddlery at Cawnpore &c. &c.

The Commission met 10-30 A. M.

Minute No. 43 of 7th July 1874, was read and confirmed.

The marginally noted correspondence was laid before the Commission.

With reference to Special Ordnance Commission No. 117 of 23rd June 1870, a telegram to be sent to Colonel Stewart, asking for reply.

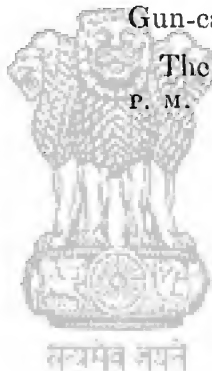
Printed statements of the store transactions of the Bengal Ordnance Department were laid before the Commission.

The questions from Commissaries of Ordnance were drawn up and copy ordered to be sent to Colonels Hatch and Stewart.

The suggestions of the Sanitary Commissioner in No. 345, dated 8th July 1874, were directed to be carried out.

The Commission discussed the statements of carriages, &c., out-turn of the Gun-carriage Factories.

The Commission adjourned at 12-30 P. M.





*Draft of Questions to Commanding Officers*

From what source are the Ordnance Store in use with your regiment immediately supplied?

Is there any delay in meeting your requisition?

Have you ever been located in stations at any distance from an arsenal or Ordnance depôt; if so, whence were your stores obtained, and were they readily procurable?

Was any actual loss of efficiency of your corps experienced by the distance from an Arsenal?

In whose charge is the camp equipage of your regiment? On an emergency how would you obtain possession and after what delay?

What is the system for the care and preservation of camp equipage while in regimental possession? Are you required to return it in serviceable condition?

From your experience of the system, do you find that the camp equipage comes to you in perfectly serviceable condition fit for immediate service?

Are you aware of that system prevailing in Bengal where each regiment and battery keeps its own camp equipage in regimental possession, and from your experience of the system prevailing in the Bombay Madras presidency, are you able to give an opinion as to which may be preferable?

What additions to existing regimental store-rooms would be required if camp equipage were placed in regimental charge?

What is the complement of ammunition in actual possession of the regiment? when is that in excess of what is carried in pouch stored?

*Madras* Is this the universal system in the ~~Bombay~~ Presidency; if not, state which system works best in your opinion?

Has there been any delay in procuring ammunition on the occasion of being suddenly ordered out of cantonments?

Do you think that a central station magazine in charge of the Royal Artillery would be a good and preferable system.

Can all repairs of regimental equipment be effected by regimental establishment under regimental supervision ?

If not, what is the system followed when repairs of arms for instance have been necessary.

Can the arms of the regiments be browned in the regiment, or is it necessary to send them to an arsenal.

4 { Have the Native Armourers of regiments been trained to the above work, and are they, as a general rule, been found efficient ?

Are there any workshops in the regiment, and what may be the nature and extent of work which can be executed ?

Can the manufacture and repair of barrack furniture &c., be effected ?

5 { Are the artificers of your Battery competent to effect all repairs, and can all materials required for the purpose be readily procured ?



सत्यमेव जयते

Minute No. 44 of 10th July 1874, was read and approved.

Minute No. 45, dated 14th July 1874.

The marginally noted correspondence was laid before the Commission.

With reference to No. 352M of 10th July 1874, it was decided to amend the form by placing the strength of the troops opposite the name of the place.

With reference to No. 4294, Bombay, of 9th July 1874, noted, to ask as to "other departments" for which stores were landed, the statement for telegraph stores not being required.

Information as to areas of storage in arsenals to be asked for according to Inspector-General of Ordnance's No. 965N of 11th February 1874.

The statement of cubical space required for storage of regimental complement of service small arm ammunition for British and Native Infantry Regiments and Cavalry Regiments and Batteries of Artillery, handed in by President, and ordered to be entered in the ammunition appendix, and similar forms to be sent to Madras and Bombay.

The map which has been prepared was laid before the Commission, and it was decided to have the circles of Ordnance supply entered therein.

The Commission adjourned at 12-30 P. M.

#### *Receipts.*

No. 951N, dated 10th July 1874, from Inspector-General of Ordnance and Magazines, Bengal, forwarding a statement shewing the cubic space required for storage of regimental complement of small arm service ammunition for Batteries and Native Infantry Regiments &c.

No. 965 IX dated 11th July 1874, from Inspector-General of Ordnance and Magazines, Bengal. Form of statement shewing the extent of storage in an arsenal or depôt.

No. 381, dated 10th July 1874, from Inspector-General of Ordnance and Magazines, Bengal, forwarding a statement showing the average number of extra lascars employed in the several arsenals or depôts, and the aggregate annual cost thereof.

No. 382, dated 10th July 1874, from Inspector-General of Ordnance and Magazines, Bengal, forwards a statement showing the rate per cwt. for the transport of stores by rail-road and water from the several arsenals and depôts to the military stations dependent thereon.

#### *Issues.*

To Secretary, Military Department, No. 131, dated 11th July 1874, forwarding the Commission's report on the pay &c., of the Master Refiner at Ishapore Gunpowder Factory.

To Inspectors-General of Ordnance and Magazines, Bengal, Madras and Bombay, Nos. 132-33-34, dated 11th July 1874, calling for four copies of last printed list of regulated proportion of service ammunition for batteries of Royal Artillery &c., &c.

Commissary of Ordnance, Fort William, No. 135, dated 11th July 1874, calling for a complete set of form of headings of return and books used in the Fort William Arsenal.

कर्ममेव नयते

*Minute No. 46, dated 17th April 1874.*

*Receipts.*

From Inspector-General of Ordnance and Magazines, Bengal, No. 980N, dated 14th July 1874, forwarding statement showing the labor and material expended, and the cost of making up sets of harness and saddlery at Cawnpore.

Military Department No. 957, dated 15th July 1874, forwarding correspondence and statement showing the cost of accoutrements made up in the Grand Arsenal, Bombay.

*Issues.*

To Inspectors-General of Ordnance and Magazines, Bombay and Madras, Nos. 136 and 137, dated 16th July 1874, calling for a statement showing total number of Gun-carriages issued to Batteries &c., during the year ending 1st April 1873.

To Superintendent Gun-carriage Factory, Fatchgarh, No. 138, dated 16th July 1874, calling for further information shewing the highest working capacity of the factory.

To Governments of Madras, Bombay and North-Western Provinces, Nos. 139, 140 and 141, dated 16th July 1874, asking for information regarding the conditions of climate at Madras, Bombay, Allahabad and Fatchgarh.

To Examiner, Ordnance Accounts, Calcutta, dated 16th July 1874, No. 142, enquiring whether certain statements of issues furnished by him include the whole of the issues from the Arsenals or the Gun-carriage Factory or both together.

To Inspector-General of Ordnance and Magazines, Madras and Bombay, Nos. 143-44, dated 16th July 1874, calling for further information regarding the out-turn of the Gun-carriage Factories.

The Commission met at 10-30 A. M.  
Minute No. 45 was read and confirmed.

Marginally noted correspondence was laid before the Commission.

With reference to Minute No. 45, it was decided to add to the Bengal, &c., statements of stations and units dependent, the cost of transport given in statement with Bengal Inspector-General of Ordnance's No. 352M of 10th July 1874.

The map prepared with circles of Ordnance supply entered thereon was laid before the Commission.

The statements which remained to be printed were laid before the Commission, and the Secretary's proposals approved.



The Commission met at 10.30 A. M.  
Minute No. 46, dated 17th July 1874,  
was read and confirmed

It was decided to make out a form of report to General Officers, giving information as to the objects of the Commission. The form produced by the Secretary to be used on arrival at stations.

In regard to the list of stations dependent on arsenal and the cost of transport, it was decided that it would be better to revise the statement by the G. O. of 1870.

Printed statements were laid before the Commission and discussed.

It was agreed that the memorandum which was drawn up by the President should be copied for distribution and form a guide to the method of inspection.

The Commission adjourned at 1 P. M.

Minute No. 47, dated 21st July 1874.

#### *Receipts.*

From Commissary of Ordnance, Fort William, No. ---- dated 14th July 1874, forwarding a statement shewing the different forms and returns in use in the Fort William arsenal.

From Inspector General of Ordnance and Magazines, Bombay, No. 4437, dated 15th July 1874, forwarding four copies of statements showing the regulated proportion of service ammunition for Batteries of Royal Artillery, &c., &c.

From Inspector-General of Ordnance and Magazines, Bombay, No. 4414, dated 14th July 1874, forwards statements shewing the cost of a set of universal saddlery and of a set of harness, Artillery.

From Military Department, No. 527, dated 8th July 1874, forwarding an inspection report of the arsenals and depôts in the Bombay Presidency, also correspondence regarding the condition of the Mhow and Neemuch road.

From Inspector-General of Ordnance and Magazines, Bengal, No. 1029, dated 10th July 1874, forwarding statements shewing the proportion of tents issued to corps and their value in the last three years &c., &c.

From Inspector-General of Ordnance and Magazines, Madras, No. 1749, dated 14th July 1874, giving number of carriages made up at Gun-carriage Factory during past 10 years.

From Examiner of Ordnance Accounts, No. 2416, dated 15th July 1874, stating that the return previously furnished included all issues to batteries from Ordnance Office and Gun-carriage Factories during past 10 years.

#### *Issues.*

To Inspector-General of Ordnance and Magazines, Bombay, Nos. 147 and 148, dated 20th July 1874, Madras

asking for two or three copies of the Chief G. O's. on the subject of camp equipage.

To Inspector-General of Ordnance and Magazines, Bombay, calling for information regarding the transaction of the Grand Arsenal, Bombay, for landing and forwarding stores for the Telegraph Department.

To Assistant Surveyor-General, No. 152, dated 20th July 1874, forwarding a map, and requesting that copies may be made for the Commission, and certain details filled in.

Exd. G. C. Meekerjee.

*Minute, 48, 3rd August 1874.*

# RECEIPTS.

From Inspector-General of Ordnance, Madras. Forwarding a statement showing the number of Carriages, &c., made up at the Gun Carriage Factory and issued during the 10 years ending 1st April 1874, No. 1749, dated 14th July 1874.

From Inspector-General of Ordnance, Madras. Forwarding a statement showing the cost of a single set of saddlery for a field battery and of a set of Artillery wheel and lead harness, No. 1712, dated 11th July 1874.

From Inspector-General of Ordnance, Bengal. Forwarding statement showing the expenditure incurred in the repair of Camp Equipage during the years 1870-71 and 1871-72, No. 444M, 21st July.

From Inspector-General of Military Works. Forwarding correspondence showing the system of supply of Barrack furniture in the Military Works Branch and suggesting that the Public Works Department be asked for a copy of their Code and G. G. O., No. 303 of 21st March 1872, No. 4230, dated 16th July 1874.

From Inspector-General of Ordnance, Madras, No. 7735, dated 16th July 1874. Submitting two statements showing the store transactions of the Madras Manufacturing Establishment.

From Inspector-General, Military Works, No. 4264, dated 17th July 1874. Forwarding two copies each of the standard plans of the Regimental Magazines of a Regiment of Native Infantry, of a Regiment of British Infantry, &c.

4538 of 20th July 1874, from I. G. O., Bombay, enquiring whether a scale of the furniture supplied is required or a list of the whole of the furniture in use with the Army.

4845 of 30th July 1874, from I. G. O., giving the number of Carriages which could be made up in the Gun Carriage Factory, Bombay.

4562 of 29th July 1874, from Adjutant-General, Bombay, giving proof of revised section of Regulation on Ammunition.

Memo. from O. O., giving space for storage of Camp Equipage.

\* The Conversion report merely contains statement of labor and material unpriced. It is first sent to I. G. O., who sends it to the Examiner, and prices it. Conversions over 50 Rupees require special order.

(2) and (3) and (4) are sent to Ordnance Examiner.

An Annual list of remains of all articles in store. This is retained by him, and kept up from month to month by comparison, with the Monthly Return, (3) 1 copy is kept by the Examiner and 1 by the Commissary.

+ (3) and (4) are sent to Ordnance Examiner. .  
This is compared with previous month's list of remains in his Office.

The Commission met at the Mhow Arsenal at 11 A.M.

Minute, 47 of 21st July 1874, was read and confirmed.

It was decided to leave Mhow on Thursday and the Secretary was directed to address the Assistant Quartermaster-General accordingly.

The Secretary explained what had been done in regard to the preparation of the map, the steps taken to collect the information require<sup>d</sup> for the large map, and laid before the Commission a map prepared by him, showing military stations, arsenals, magazines and circles of ordnance supply.

The questions to be put to Commanding Officers were discussed, and it was resolved to add the following :—

“ Could the force at this station be kept efficient if it were dependent for its ordinary Ordnance supplies on Bombay, Camp Equipage and reserve ammunition being totally available and the supply of Barrack furniture otherwise arranged for.”

“ Has your regiment or battery, English or country harness and what is your opinion of their relative quality.

It was decided to ask the Government of India for the report on the Forts of the Bombay Presidency.

The Commission adjourned to the Office of the Commissary of Ordnance, and inspected the following books.

\* The following were inspected : —

## 1. MORNING REPORT.

By this it appeared that the number present were,

1 Commissioned Officer.

13 European subordinates.

4 Maistries.

155 Lascars, &c., (including tent lascars.)

144 Extra Establishments of workmen, &c.

Total 317.

1. Conversion Report. .

2. Monthly list of Remains.

3. Quick Stock Report.

4. Monthly list of Dead Stock Report, which embrace the articles only in which transactions have taken place.† These are not kept up in Bengal. In the Bombay Presidency the ledger is not sent to the Examiner.

5 Abstract Book.

6 Ledgers.

The following are also kept up :—

Acquittance Book.  
Annual and Quarterly Returns.  
Abstract of Workmen.  
Postal Register Book.  
Fine Book.  
Contingent Bills.  
Digest of all orders published.

The Commissary of Ordnance, Lieutenant Johnson, R. A., spoke of the constant incidents for small demands for Regiments.

It appeared on examination of the books that a large proportion of the work was for Barrack furniture.

The Commission inspected the defences of the Fort, and adjourned at 5 P. M.

## ISSUES.

To Military Department, No. 155, dated 21st July 1874. Returning original papers regarding the condition of the Mhow and Neemuch roads.

To Superintendent, Gun Carriage Factory, Bombay. Forwarding copies of the minutes and of a rough draft of questions to be put to Commanding Officers for Colonels Hatch and Stewart.

To Inspector-General of Ordnance, Madras. Requesting him to submit in the form prescribed a statement showing the number of carriages issued to Batteries and Forts during 1863-64, 1872-73.

To Examiner of Ordnance Accounts, No. 153, dated 22nd July 1874.

Do. do. 1873-74.

To Inspector-Generals of Ordnance, Madras and Bombay, Nos. 160 to 163, dated 23rd July 1874. Requesting to fill up and forward a statement in the form prescribed of the work performed during the past three years.

To Inspectors-General of Ordnance, Madras and Bombay, Nos. 165, 166, dated 23rd July 1874. Forwarding for completion a form showing the number of extra establishments.

To Inspectors-General of Ordnance, Madras and Bombay, Nos. 167, 168, dated 23rd July 1874. Requesting to fill up and return in the form sent a statement showing the cubic space required for storage of regimental complement of service small arm ammunition.

To Inspectors-General of Ordnance, Bombay and Madras, Nos. 169, 170, dated 23rd July 1874. Requesting to fill up and return a statement showing the store transactions.

To Inspector-General of Ordnance, Madras, No. 172. Requesting to submit a statement showing the cost of freight per ton of Ordnance Stores from England to Madras.

To Superintendents Gun Carriage Factory, Bombay and Madras; Superintendents Gun Powder Factory, Madras and Bombay; Superintendent Small Arm Ammunition Factory, Kirkee, Nos. 173, 177, dated 23rd July 1874. Requesting information on certain points.

To Military Department, Nos. 179, 180, dated 24th July 1874. Returning original papers.

A Memo. "Procedure of the Ordnance Office," was handed in by the Commissary of Ordnance, read and attached to the Minutes marked A.

*Minute 49, 4th May 1874.*

The Commission met at the Mhow Arsenal at 11 A. M.

Minute 48 was read and confirmed.

Lieutenant Johnson, R. A., the Commissary of Ordnance, appeared before the Commission and was asked to explain his opinion in regard to Magazine Serjeants, expressed in Answer 3, to the questions to Commissaries of Ordnance. He thought that that greater care was necessary in selecting Non-Commissioned Officers for the post of Magazine Serjeant, and desired a more stringent probation. He stated he would open the rank of Sub-Conductor to superior Non-Commissioned Officers.

Addition was also made to his answer to No. 6 question as follows: "The attendance of the extra men is quite sufficiently regular."

It was resolved to add the following to the questions to Commissaries of Ordnance.

17A. Would any reduction in your establishment be feasible if you were relieved of the duty of supplying and repairing Barrack furniture.

17B. Would any reduction in your establishment be practicable if the regiments, in your range had their Camp Equipage in Regimental charge. The reserve Camp Equipage only being kept in Ordnance charge and considered as an advance supply?

The Commission proceeded to inspect the various branches of the arsenal.

They visited :

1st. Petty Stores Branch and inspected the following books kept up :

1. Ledger.
2. Receipt Book.
3. Issue Book.
4. Warrant Book to make up new articles.
5. Warrant Book to repair articles.
6. Indent Book for articles for Grand Arsenal.
7. Requisition Book for articles from G. A.
8. Requisition Book for articles from local market.
9. Book showing articles due to Corps and Departments.



10. Warrant Book drawing and returning articles for dead stock.
11. do. do. for conversions.
12. Day Book showing all articles issued to conversions.
13. Morning Report.

It appeared that stores issued to Corps at Mhow are collected in the branches, and the Issuing Conductor informed when the stores are ready. The indent is sent to the Quarter Master who comes and receives the stores.

When stores are issued to an out-station they go to the issuing Conductor.

#### 2nd. Armourer's shops.

One Armourer and a Native assistant employed. 1 Sepoy was training for the post of armourer. It was stated that as a rule the British Regiment does its own repairs. Browning is done for all Regiments in the Arsenal.

#### 3rd. Artificers branch, or workshops.

The books were inspected and consisted of:—

1. Work book showing the manner in which each man is employed, and the material.
2. Daily Muster Roll.
3. Conversion Book showing the labor and material on each job.

A book was also kept called the Rough conversion book showing the workmanship employed, "fixed" and "extra" and material.

It was noticed that in the "statement of Stores repaired for Barrack Department," an Indent of November 1872 for garden tools and barrows was complied with in June 1874. The Conductor in charge stated that the indents from the Barrack Department were received very late, and the repairs sometimes effected long before the indent is received.

- |                            |             |
|----------------------------|-------------|
| 4. Arms and Accoutrements. | } Branches. |
| Harness and Saddlery.      |             |
| Camp Equipage.             |             |

About 3,000 stand of arms packed in boxes, and 400 Sniders.

Corps send in Annual estimates for the stores they require from the Ordnance Department.\*

\* Note to make enquiry as to an Arsenal sending in annual estimate.

### 5. Ordnance and Laboratory.

All blank ammunition for the force dependent on Mhow is made up in the arsenal.

### 6. S. A. Ammunition Magazines and Powder Magazine.

### 7. Receipt and Issue Departments.

The following books were kept up :—

Register of Indents.

Receipt and Issue Books.

Warrant Book.

The Commission adjourned at 4-45 P. M.



The Commission met at 11 A. M. Min. 49, was read and confirmed.

*Minute 50, 5th August 1874.*

Major-General G. S. Montgomery, C. S. I., Commanding the Mhow Division of the Army.

The ordinary supplies could be made from Bombay, speaking generally, and if Regiments and Batteries executed their own repairs. The H. A. Battery arrived packed from Bombay, and had to be repaired in the Arsenal. Nusseerabad could be better supplied from a Bengal Arsenal. The P. W. D. supply some articles, and the Ordnance Department other. The P. W. D. have workshops which could supply Barrack furniture. At Neemuch there is an equipment for a Heavy Field Battery kept up fit for issue for service.

It would be better to have a Regiment complete with its own Camp Equipage, but spare Camp Equipage would be required in the Depot for cholera cases.

With regard to Ammunition it would be better to have the service reserve ammunition of Regiments concentrated in a central station magazine under European charge.

Considers that Barrack furniture could be obtained cheaper by contract.

Captain Huyshe, Deputy Assistant Quarter Master General.

Camp Equipage is in charge of the Quarter Master General of the division, but kept by the Commissary of Ordnance.

Camp Equipage is kept up for the whole of the division.

A reserve of 3rd class tents is kept up for standing Camp.

Camp Equipage is sent to Egutpoora, Khundwa and Deolalee for standing Camps. This was done last year.

At an out-station like Mehidpore, it is kept by the regiment at Neemuch and Nusseerabad in charge of the Staff Officer.

There is correspondence between Corps and the Ordnance Department as to the condition of Camp Equipage and deficiencies. The D. A. Q. M. G. marks on the indent what ought to be charged to the regiment; and if the Commanding Officer objects, a Committee is convened. The final arbiter is the Quarter Master General.

There is much difficulty in getting back the Divisional tents. At Khundwa rest Camp, there was also great difficulty in making the responsible person pay for damages.

It would be much better if each regiment had its own Camp Equipage.

I. No delay. An estimate is made out and sent in 2 years in advance.

Colonel Cahusac, 16th Bombay N. I.

Has not been at a station away from depot.

II. No delay—always issued complete and serviceable. It is better kept in an arsenal as there is so little service now-a-days. Has a store room in which camp equipments could be kept.

III. 200 rounds service ammunition.

90 do. practice do.

Has only lately the magazine in regimental charge.

The ammunition in the arsenal is at his disposal.

Each man has 20 rounds in pouch, *i. e.*, of the 90 rounds. The practice ammunition is in regimental charge.

No delay in issuing.

Thought that the whole ammunition might be kept in regimental charge safely.

IV. Could not repair the breech of a rifle, ordinary repairs could be done. But could not make difficult repairs. Could not make a stock for instance. That is carpenter's work. If the N. I. had interchangeable arms, there would not be this difficulty.

The armourer can brown the arms but there is no tank. The native armourer has been instructed in the arsenal. All repairs to arms could be done except special repairs; even accoutrements. The regiment is independent.

Colonel E. A. H. Bacon, Bombay S. C., Commanding 25th N. I.

I. Supplies from the Mhow Arsenal.

Has been at Malligaum. Drew supplies for Poona. No difficulty in obtaining them.

II. Camp equipments not necessarily returned in serviceable condition, but if the damage is by neglect, or there is a deficiency, then the regiment is charged. No delay in issuing; keeping camp equipage in arsenal, is better than in regimental charge, there is so little use for it.

III. Has the whole 200 rounds, and the practice ammunition in regimental charge, now there is a regimental magazine. The whole ammunition might be kept in regimental charge.

VI. All repairs of regimental equipment can be done regimentally. No browning apparatus, but he has an instructed armourer able to brown arms. The regiment in itself is independent an arsenal.

Colonel Fitzgerald, Commanding 49th Foot.

I. No delay—Has the whole ammunition 200 rounds in regimental charge.

Has been at Deesa, supplied from Ahmedabad. Great delay in getting supplies from Bombay. This is chiefly due from the delay in getting supplies between Deesa and Ahmedabad. From Ahmedabad by country carts—10 marches. The whole of the accoutrements were nearly destroyed. No escort given often. From 1865-69 was at Deesa. Was for a year and a half without a large number of accoutrements, and therefore not complete in equipment.

II. It would be convenient if camp equipage were kept in regimental charge.

If a sudden move has to be made, there is delay in getting the camp equipage out of

store for want of Quarter Master General's signature. Great delay in getting out the camp equipage at Deesa. Has place for store-room.

III. Has the whole complement of ammunition. At Deesa no magazine. Might be better perhaps to have all in a central magazine under European charge.

IV. All repairs of regimental arms and equipments can be effected regimentally.

If a rifle be much damaged the barrels being bulged, the arms have to be sent to Bombay.

V. Press and book binding, no workshops. Had workshop at Deesa but could not compete with native labor. Has 2 men working in the arsenal.

I. There is delay, so much has to be got from Bombay. Rarely able to get what is wanted from Stores. The S. T. M. used to do all repairs, but now under the new equipment the material allowed is not sufficient. Many of the saddles are very old.

II. Camp equipage never in charge of regiment. Unaware of any difficulty, but believes there is delay in getting it from Quarter Master General; would be better kept in regimental charge.

III. All repairs can be effected regimentally. But there has been delay in getting the materials. Perhaps somewhat under-estimated for the requirements. Allowed 27 trees and had to repair 80.

No regimental workshops.

No time in a cavalry regiment.

I. No difficulty or delay.

II. No Camp Equipage.

Delay in getting it out.

Better to have it in regimental charge. Does not think there could be any delay if kept in arsenal at disposal of Commanding Officer.

II. Repairs are all done in the arsenal with the assistance of the battery artificers. If out of cantonment would have to effect the battery repairs. Could do the repairs but perhaps not so efficient. Has not complement of material. Makes budget estimate, and draws as required. Has a very small quantity of material. Provided he has the material there would be no difficulty in effecting the repairs.

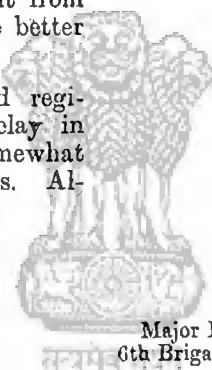
About 1 dozen a month, or 144 a year.

I. Always near an arsenal.

No delay in getting stores under present system.

II. Does not see advantage of having camp equipage in regimental charge. No delay in getting camp equipage under present system.

Major Blundell, Commanding 3rd Hussars.



Major Mahon, R. A., Commanding No. 2 Battery, 6th Brigade, R. A., Heavy Battery.

How many requisitions, do you send into the Arsenal?

Colonel Wallace, C.B., Commanding R. Artillery, Mhow Division of the Army.

III. Certainly all ordinary repairs can be done. Not usual to send carriages to an arsenal for repair. But sometimes it must be necessary to send carriages for extensive repairs to an Arsenal. The Battery a Nusserabad came from Poona, and the shaking was so great that the repairs had to be effected at the station by the artificers sent from Neemuch Magazine. Any battery coming direct from Gun Carriage Factory, Bombay, requires repair in consequence of the great difference of climate.

## IV.

Yes.

Could it not be arranged that frequent small incidents should be avoided?

What is your opinion as to the relative merit of English contract harness and that made up in Bombay?

Yes by a little foresight, but the Heavy Battery here labors under the want of accommodation.

Considers the Bombay-made harness good, but the curing is defective. Better than some of the English harness sent out in the country.

Considers that the Artillery would be efficient if the batteries were dependent on Bombay, provided a proportion of materials prepared, say 6 months, were in battery possession.

Major T. P. Smith, Commanding E. C., R. H. A.

I. Sometimes complied with immediately, but often has to get supplies from Bombay. For instance there was no serge. Was at Morar in temporary command for two years, and had no difficulty in getting stores for Agra.

II. The Camp Equipage should be kept regimentally if possible, otherwise in separate deposit in an arsenal or dépôt. Under the first system no delay. Perhaps better to keep it in a arsenal separately for regiments.

Not much delay (say 36 hours) but the men are taken away from the battery.

IV and V. All the ordinary repairs, but not such as change of pattern. It could be done slowly. But for ordinary repairs and keeping the battery in efficient condition, the battery is complete in itself.

The Battery does its own repairs.

No practical delay in getting materials.

Has not been able to get any equipment table.

V.A. Country-made with certain exceptions, Saddle seats, Flaps, Stirrup leathers. The country leather is not sufficiently tanned. There is not sufficient supervision in the tanning and preparation. Belly used in Bombay, quite contrary to the English practice. Great weakness in the straps, and in the harness generally.

The reins in England are made thick; in this country, of cow hide. Collars stuffed with rice straw, and out of shape when they shrink and gall the horses.

Whips were supplied, badly made with bits of basil through, and cow hide instead of horse hide outside. The English whips stood excellently.

The Commission adjourned at 2-30 P. M.

The Commission met at the Nagpur Magazine at 7-30 A. M. *Minute No. 51, dated 10th August 1874.*

Minute 50 of 5th August 1874, was read and confirmed.

Proceedings of Madras Government Order, No. 2347 of 24th July 1874, with reference to the position and military value of Nagpur, read by Col. Stewart, and a copy ordered to be applied for.

C. Proceedings, P. W. D., No. 5012 of 6th August 1874, to the Commissary of Ordnance, laid before the Commission and the offer of papers, &c., relating to the Nagpur Arsenal and Seetabuldee Fort, and the attendance of the Executive Engineer, ordered to be accepted with thanks marginally noted cover also laid before the Commission.

No. 3,392 of 28th July 1874 from Quarter Master General, Bombay Army, forwarding General Orders relating to Camp Equipage.

The additional questions directed to be put to Commissaries of Ordnance having been answered by Lieut. Johnson, R. A., were read and attached marked A.

The explanation of Lieut. Johnson in regard to the number of indents acted on in the Mhow Arsenal was read and attached marked D. The Commission inspected the Nagpur Magazine in charge of Captain Maclaverty R. A. \*

\* Present state of Establishment Nagpur Magazine handed in and annexed marked C.

They visited :

1. The Gun-shed and Ordnance Stores. In this branch a *ledger* ; and *material and labor work report* ; were kept up. A rough *journal* was also used during press of work, but usually issues and receipt were posted direct to the ledger. The branch ledger being compared daily with the Office journal, and monthly, with the Office ledger.

Materials for making up articles were authorized by the Commissary of Ordnance, and the return of labor and material expended initialled by him. It appeared to the Commission that the journal should be maintained.

## 2. Workshops.

In this branch the following books were kept :—

Ledger.

Journal.

Material and Labor Book.

Report book showing the work done during the month under each foreman or artificer. This report book merely shows how the artificers are employed, but as it contains no record of material expended, it appears to be of little use.

## 3. General Stores.

Paint and Tar godown, tools, &c.

## 4. Armoury.

3,900 stand of arms.

## 5. Quartermaster's Stores.

Including harness, saddlery accoutrements and regimental equipments.

## 6. The Commission visited the magazine.

## 7. The Issue and Receipt Department.

Memo. showing the distribution of the warrant officers, &c., and charges, handed in and attached marked D.

They examined the book kept up, which appeared to be a journal or gate book showing everything passing out of, or into, the arsenal.

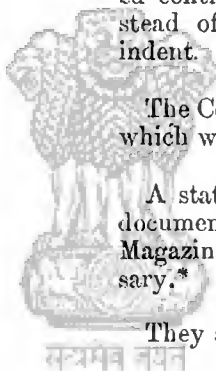
The "register of Indents," only lately commenced was inspected, and it appeared to the Commission that corps and batteries indented continually for the smallest articles, instead of including them in one periodical indent.

The Commission inspected the office books which were as per Annexure E.

A statement dated 11th August 1874 of documents despatched from the Nagpur Magazine was handed in by the Commissary.\*

\* File Nagpur.

They adjourned at 2 P. M.





The Commission met at 7-30 A. M. at the Nagpore Magazine, and accompanied by the Executive Engineer and Officiating Commissary in the Fort, inspected the Sitabuldi Fort, and its outwork.

They afterwards went through the correspondence connected with the Fort and the Arsenal furnished to them by the Chief Commissioner, C. P.

The marginally noted correspondence was laid before the Commission.\* Captain Maclaverty, R. A., explained that stores are sometimes sent to Saugor, Jubbulpore and Dorunda. Such as accounts and those that are of a peculiar Madras pattern. Stores are now all sent by the Commissariat. He used to receive stores direct from the railway. All transport of Stores is now arranged for by the Commissariat.

The Commission adjourned at 12-30 P.M.

*Minute No. 52, dated 11th August 1874.*

\* 238 C. of 29th July 1874, from Superintendent S. A. A. Factory, Dum-Dum, forwarding plan of the Factory.

2167 of 31st July 1874, from Secretary to Government, Bombay, forwarding Meteorological Statistics of Bombay.

2013 of 1st August 1874, from Officiating Inspector General, Madras, forwarding Statements regarding the number of carriages made up at the Gun Carriage Factory.

2014 of 1st August 1874, from Officiating Inspector General of Ordnance, Madras, giving information as to cost of freight, &c.

2016 of 1st August 1874, from the Officiating Inspector General of Ordnance, Madras, forwarding 2 copies of Government Order about Camp Equipage.

2875 of 1st August 1874, from Secretary to Government of Bombay, giving permission of the Bombay Government to visit the Ordnance Establishments in the Bombay Presidency.

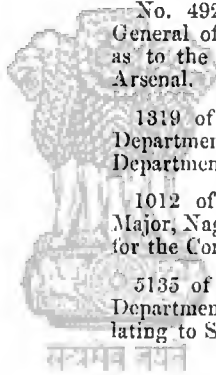
No. 4923 of 3rd August 1874, from Inspector General of Ordnance, Bombay, giving information as to the number of carriages supplied to the Army.

No. 4921 of 3rd August 1874, from Inspector General of Ordnance, Bombay, giving information as to the work done for the Navy by the Grand Arsenal.

1319 of 5th August 1874, from Public Works Department, stating that no copy of Public Works Department Code was available.

1012 of 10th August 1874, from the Brigade Major, Nagpore, asking what hour will be convenient for the Commission.

5135 of 10th August 1874, from Public Works Department, C. P., forwarding correspondence relating to Sitabuldee Fort and the Nagpore Arsenal.



*Minute No. 53, dated 12th August 1874.*

From Officer Commanding H. M's 16th Regiment, bringing to notice certain defects in the material and workmanship of certain supplies to his Regiment.

\* Distribution of tent lascars shown in Annexure A.

The Commission met at 10 A. M. at the Camp Equipage Depôt, Kamthi.

They inspected the books of the Depôt. Morning Report Book\*.

The following was the distribution :

3	Syrangs and Tindals.
15	Lascars.
20	do. Nagpore Magazine.
3	do. Quartermaster General's Orderlies.
1	do. General's flagstaff.
3	do. Sick and absent.
<hr/>	
45	Total.

A list of the Camp Equipage and Sick Carriage, and Gunpowder in the Grand Magazine at Kamthi is contained in Annexure A.

*Ledger.*—Return of Camp Equipage and Sick Carriage in store.

*Journal.*—From which it appeared that in the busy season the average was about 30 to 32 transactions, some of which were inter-departmental, while in the hot season 9 or 10 was the average.

Colonel Raikes, Commanding 44th Foot

The Commission proceeded to take the evidence of Commanding Officers.

I. From the Arsenal at Nagpore. No delay. When first arrived from England had no Snider ammunition supplied for a long time ; never far from an Arsenal.

II. Not in regimental possession. Is serviceable when issued. But prefers the Bengal system. Would require considerable storage room. When the doctor requires tents, there may be a day's delay. The detachment at Sitabuldi.

III. 200 rounds in regimental possession with exercising and practice ammunition.

Would not be a good thing to have all ammunition in Station Central Magazine, but if at disposal of regiment and not too far, considers it would be a good arrangement as a matter of policy, if under charge of Europeans.

IV. Can all be effected regimentally.

Regimental workshops but found that the Commissariat did not accept tender on account of it not being so cheap as others

I. From Nagpore. No delay, never farther than this.

II. No. Obtains it from the depôt. Marched for a long time and executed petty repairs.

Has no place for storage, and prefers being able to draw it to keeping it himself.

Colonel Stainforth, Commanding 2nd Light Cavalry.

III. Has a good magazine.

Has service and practice ammunition.

Would be better to have the whole ammunition concentrated in a Central Magazine at the station provided it is under European charge. But considers, that the annual supply should be kept in regimental charge.

Has 12 carbines E. M. L. R. per troop. Has sent an armourer to train at Secunderabad.

Repairs in the regiment.

Draws money quarterly of the average annual contract. Keeps up workmen and buys the leather. If local supply fails, has to send to Bellary. The country leather is good, but lately dearer, and as dear as in England. Believes that the large export of hides is the cause of it. Has always sufficient supply for the regiment to take the field.

Quarterly account is sent in of what is expended, and the amount left divided among the Commanding Officers.

Saddle and Bridle, Rs. 2-8, 8 monthly.

Makes and repairs his saddlery.

Clears Rs. 110 a month.

I. From Nagpore. No delay. Once some little delay in getting Rangoon oil. Has been at Mercara, Mangalore. No difficulty in getting stores from a distant arsenal.

Colonel Pringle, Commanding 35th Madras Native Infantry.

II. No Camp Equipage. No delay. At out-stations used to have Camp Equipage in regimental charge. If the force is to be ready to move, should have its own Camp Equipage. The Quarter Master and the lascars would not be able to look after the Camp Equipage. No storage. At single stations had room for tents.

III. Regimental Magazine is too small for the E. R. ammunition. Thinks it would be a good thing to have a central magazine in the station, decidedly.

IV. Has enlisted and trained armourers. Has indented for apparatus for browning. materials obtained on payment from the arsenal. Sometimes obtains materials from the bazaar.

I. From Nagpore. No delay. Has always been at large stations.

Colonel Ritherdon, Commanding 22nd Native Infantry.

Was at Jubbulpore. No delay in getting stores.

II. At Jubbulpore was in charge of Camp Equipage. Prefers having the tents in regimental charge, but has experienced no delay under present system. Has one room, but scarcely storage room for tents. Has store room and place of arms combined.

III. Has full complement of ammunition of 200 rounds in charge, except what is expended in practice. No delay. Perfectly safe in leaving the ammunition in regimental charge. Would not make much difference if it were stored in station magazine.

Would not object to it.

IV. All repairs can be effected regimentally.

No trained armourer. Could not get a man to volunteer. Has a Maistry; is not sure if he is certificated. Has no workshop nor apparatus for browning arms.

Colonel Dance, Royal Artillery.

I. Was at Sittang, Palamcottah. No delay.

II. In no case in regimental charge. Prefers the system of having it in regimental charge decidedly.

IV. Capable of effecting repairs, not alterations. There are, however, large portions of work which might not be able to be repaired. Has marched a good deal and has always been able to effect all repairs.

D Battery, 20th Brigade, had to be sent in to the arsenal on its arrival from the march from Bangalore to Nagpore; the battery had not been properly taken care of.

VI. The artificers can effect all repairs.

VI.a. The country leather good sometimes. The harness he had made up under his own eye. It looked excellently, but did not last. Does not think country harness will stand wet.

Major Penny, Royal Artillery, Commanding D Battery, 20th Brigade.

I. Nagpur Arsenal. Has been a little delay, but that was on a change of equipment. Has been always where a depôt or magazine exists. At Thyetmyo stores had to be got from Rangoon.

II. The Camp Equipage never in regimental charge. No experience of delay. Should have an establishment if the battery has charge of the Camp Equipage. It would be a better plan decidedly to have Camp Equipage in regimental charge, but has no storage accommodation.

IV. Heavy work has to be sent in to an arsenal. When the battery marches, would do all repairs. Did some iron work additions the other day. As a rule all repairs can be done in the battery.

There is a supply of material which may be kept up, but usually draws as wanted. Obtains material from the arsenal. Would be independent of an arsenal if materials were kept up.

VI.A. Drew English harness last year, the previous harness had been 5 years in use, and had to repair a great deal. Has now English-made harness, which has been in store 6 or 8 years. The thread had all perished. The English harness should not be kept so long in store.

Used to undertake the barrack repairs in Burmah.

Is charged 7-8 for a doorsill. The wheeler stated that it could be made up in the battery for Rs. 3. Thinks if it could be done, it would be an excellent system.

If artillery have to fill cartridges and shells, there ought to be a filling room. A tent was not given, and had to use a private tent of his own.

Camp Equipage in Kamptee sufficient for force in Kamptee. Raipore and Hoshungabad, have Camp Equipage but no carriage. Carriage at Kamptee for a flying column.

Major Swanson, Deputy Assistant Quarter Master General.

The Quarter Master General in Madras estimates for supply of tents. Supposed that it was an economical measure to keep Camp Equipage in charge of the Quarter Master General's Department. From the time that a battery would send in its indent until the time it received it, five hours might be the delay. Does not think that the present system is disadvantageous.

Good roads to the out-stations, but unbridged rivers, though open and passable.

To Raipoor, a made road except thirty miles. To Chanda impassable during the wet, and no water in hot season. Does not know as to the communications in the Hyderabad country.

I. No delay in getting stores.

Lieutenant Hepburne, Commanding E Battery, 20th Brigade, Royal Artillery.

II. Camp Equipage in the depôt. No delay. Only two small store rooms.

III. All repairs except heavy iron work. Could have put on the battery foot rests. On the march all repairs can be effected except buildings, &c. V. The artificers are competent. If stationed away from an Arsenal the Battery would be independent. VI. Leather good in the English harness in possession of the battery, but the iron-work is rough.

The Commission adjourned at 2-30 P. M.

*Minute No. 54, dated 17th August 1874.*

#### RECEIPTS.

From I. G. O., Madras, No. 1,856, dated 21st July 1874, forwarding statements showing the Ordnance and Ammunition in store in the Madras Presidency, on 1st January 1874, &c., &c.

From Superintendent G. C. Factory, Bombay, No. 1,117, dated 5th August 1874, furnishing information regarding the branches of the Factory, system of working, &c.

From Superintendent S. A. A. Factory, Kirkee, No. 776, dated 5th August 1874, on the same subject as the above.

From I. G. O., Madras, No. 2,137, dated 4th August 1874, showing the gun carriages made up at the G. C. Factory in 1863-64 and 1872-73.

From I. G. O., Madras, No. 2,094, dated 6th August 1874, statement showing the store transaction of certain arsenals and depôts in the Madras Presidency.

From Military Department, Calcutta, No. 272, dated 6th August 1874, requesting submission of a special report on the question of the promotion and pay of the soldier mechanics in the Dum-Dum Factory.

From Military Department, Calcutta, No. 280, dated 6th August 1874, proposal to establish an Ordnance Depôt at Bolarum.

From I. G. O., Poona, No. 5,038 dated 7th August 1874, statement showing the number and weight of packages received for and despatched to other departments by the Grand Arsenal, Bombay.

From I. G. O., Poona, No. 2,124, dated 7th August 1874, cubic space required for storage complement of service, small arm ammunition, &c.

From Superintendent G. P. Factory, No. 783, dated 11th August 1874, regarding the branches of the Factory system of working, &c., &c.

The Commission met at 10-30 A. M. at the Gun Carriage Factory, Colaba, Bombay, Colonel W. S. Hatch, R. A., Superintendent. They visited the Steam Sawmill, the Turning and Carpenters' Branches, Fitting Shop, General Store, Smithy and Foundry. The Smithy contains 44 forges.

*Carpenters' Branch*—Cooperage,

29 Natives.      2 Natives.

Saw Mill 1 European.

14 Natives.

*Bullet Branch*—1 Foreman.

31 Natives do the light work of the fitting branch.

*Fitting Branch*.—1 Foreman.

80 Natives, 3 Europeans, (one European.)

*Smiths*—1 Foreman.

80 Natives (1 European.)

*Foundry*.—1 Overseer.

13 Natives, (1 European.)

33 Natives on "general purposes."

They examined the books kept up in the Office of the Gun Carriage Factory. These are as per list annexed A.

The ticket system is used in the Factory. The tickets which are numbered are kept by the men, and they are dropped into a box on the men entering the Factory. The Overseer on duty collects them, and makes out his morning report accordingly. In the office they are classified according to trade, and an entry is made in the monthly report.

Each foreman keeps a daily distribution report showing how each man is employed. The "adjustment sheet" is to ensure the payments tallying with the number of men employed. The muster clerk compiles the muster roll daily.

The "Register of labour and material" is the Work report, and is compiled from the warrant book.

Each foreman has a "Warrant Book." This shows issues and receipts in his hand and is initialled by the Superintendent.

The "General Store Warrant Book" gives the information compiled to show the Superintendent what the general transactions are.

The ledger is compiled from the warrant books.

A monthly return of stores issued and received is sent to the Examiner.

In the "Annual Account" of the Factory, in the "General Charges" or "proportion," depreciation in buildings, and the wear and tear of machinery, are not taken into consideration. When a tool is worn out the difference is charged between the original cost and the price it fetches.

Components made up do not receive general charges, but only when the article is issued.

All departments dependent on the Gun Carriage Factory estimate their wants, and these estimates are received by the Gun Carriage Factory and the general estimate of them compiled.

Memorandum by Lieutenant Wace, R. A., Assistant Superintendent, dated 5th August 1874, on the system of work and account in the Gun Carriage Factory was read.

The Commission adjourned at 5 P. M.



सत्यमेव जयते

*Minute No. 55, dated 18th August 1874.*

The Commission met at 11 A. M. at the Grand Arsenal, Bombay. They inspected the books kept up.

These were as follow :—

#### PERSONNEL.

Muster Rolls of

Europeans.

Lascars.

Artificers.

Office Clerks.

Absentee List of Clerks.

Records of Europeans.

Muster Roll of Clerks.

Morning Report of European and Native Establishment.

#### STORES.

Ordnance Stores, Old Nomenclature.

Counting List of Quick and Dead Stock.

Annual Return of Brass and Iron Ordnances.

Annual Return of all Stores.

Quarterly Return for Inspector General.

” ” for Officer Commanding Royal Artillery, Bombay.

List of the principal alterations in the Nos. and quantities of principal stores.

Requisition on Gun Carriage Department.

Indent Book on different Departments.

Register of Land and Water Carriages.

Register of Packing Accounts.

Gun Carriage Receipt Book of Stores.

Orders on Contractors.

Alphabetical List of Issues to Conversions.

Rough Conversions.

Abstract of workmen employed on Conversions.

General Packing Book.

Packing books for different Arsenals.

Quarter, half and one Sheet Warrants to issue stores.

Arsenal List of remains in 5 sections.

Ledger for 1872-73 in 4 vols., 1st A to F, 2nd G to O, 3rd P to Z, 4th Camp Equipage, Obsolete and Dead Stock.

Ledgers for the years 1873 and 1874 in 8 parts, viz: 1st A to C, 2nd D to L, 3rd M to R, 4th S to Z, 5th Obsolete Headings, 6th Camp Equipage, 7th Dead Stock, 8th Turret ships.



## ACCOUNTS.

Contingent Bill, Extra Artificers.  
 Contingent Bill of Local purchases.  
 Budget Estimates.  
 Annual Return of Indents on the Home Government.  
 Audit Remarks.  
 Payment Certificate Book.  
 Remittance List.  
 Daily Cash Accounts.  
 Acquittance Roll.  
 Abstract of Pay and Objection Statements.

## ROUTINE.

Register of Postage and Despatch Book.  
 Correspondence Register, both outward and inward.  
 Monthly Return of Establishment.  
 Monthly Return of European Establishment.  
 Ration Indent Book.  
 Embarkation Return Book.  
 Arrival and Departure.  
 Departmental Orders.

It appeared from the morning report that there was a total of 42 European Subordinates, the establishment being 44. A separate establishment is kept at Poona for the Laboratory. The morning report did not show the distribution of the men into the different branches. No "register of indents" is kept in the office, but orders for issue are put into the packing book for the packing branch.

It was noted that in his Audit remarks, the Examiner directs the "writing back" of material if he considers that an excess has been used in a conversion. It did not appear clear how the material was actually replaced in stock. It appeared that an average of 277 packages per diem are received, including those for other departments, and excluding the latter 268.

The Commission examined the books of the Camp Equipage department. The "Monthly return of Camp Equipage" did not appear necessary, if the "quarterly return" is kept up. The Commissary of Ordnance objected to the dual system of work and responsibility in regard to the Camp Equipage, he merely acting as storekeeper for the Quarter Master General.

The Commission adjourned at 4-30 p. m.

Minute No. 56, dated 19th August 1874.

The Commission met at the Grand Arsenal at 11 A. M., and proceeded to visit the different Branches. They first visited

*Petty Stores Branch,*

Comprising tools, iron, steel, cloth, paints, &c., &c., leather, materials for harness.

The books were inspected.

They were as follow :—

Ledger.

Receipt and Issue Book.

Due books.

Warrant books.

Requisition on local supply.

Audit remarks.

Issue book to Conversions, Interior Economy and packing.

Bi-monthly returns of stores expected from England.

The branch was in charge of a Conductor, assistant by 1 Sub-Conductor, and 1 Magazine Serjeant and 1 European artificer lent from the artificers' branch to keep 'the ledger, &c., instead of a Magazine Serjeant wanting to complete.' In issuing stores to other branches for conversions, &c., the amount expended is entered as an actual issue at the end of the month, while the balance remaining is not returned into the store but left with the branch, and the amount carried forward as a debit against the branch receiving the stores. In the Audit remarks for January 1874, it was noticed that "Hides from Europe, tanned lbs. 420" was directed to be written back. On examination it was found that a clerical error had been made  $16 \frac{1}{4} \frac{5}{8}$  hides entered instead of  $6 \frac{1}{2} \frac{5}{8}$ . There is 1 book for external issues and 1 for conversion, &c. The Warrant book forms the current or daily record of transactions. Branch issues are made on warrants received from the office. There are either on indents or issue orders by the Inspector General of Ordnance, or on branch indent books.

Direct issues on indent are entered in the branch issue book when the transaction is made or when the Paking account is received from the Paking branch. Issues to conversions, interior economy and expenditure in packing are entered at the end of the month.

Noted to ask at Secunderabad if the Commissary of Ordnance furnishes the Examiner with vouchers attached to his monthly list, showing materials and labors employed in the arsenal in the repair of Camp Equipments.

All transactions pass the through receipt and issue book previous to entry in the ledger.

The Commission visited the *Harness, Saddlery and Accoutrement Branch*. It was stated that the shops could make up 52 saddles or 1 complete battery of harness, &c., (except saddles) per mensem.

The Ordnance branch, including park and siege train and naval stores, was visited.

The Laboratory branch was visited.

The Commission visited the Armoury, the Armourers' workshop, the Artificers' branch or workshops.

The marginally noted books were kept up.

This branch included carpenters, smiths, coopers, filemen, braziers and firemen, sail-makers, &c.

The Packing and Receiving branches and Import and Export branches were visited.

The establishment of store lascars as per table marked A, (File Bombay), was detailed by the head Syrang.

Rough Conversions, make up repairs and packing.

Quick Stock Ledger.

Dead do. do.

Branch Receipt Book.

Do. Issue do.

Branch Muster do.

Stock do. do.

Copies of Audit Remarks.

Drawing Warrant Book.

Make up do. do.

Repairs do. do.

Dead Stock do. do.

Timber Register do.

Alphabetical List.

Inward and Outward

Letter Book.

Index to Conversions.

Abstract of work.

Requisition for local supplies.



सत्यमेव जयते

*Minute No. 57, dated 20th August 1874.*

From Government of Madras (Inspector General of Ordnance, Madras) No. 2347, dated 24th July 1874, passing orders on the subject of the additions and improvements required to the Nagpore Arsenal.

From Inspector General of Ordnance, Madras, No. 2253, dated 15th August 1874, Statement showing the average number of men employed monthly in the past three years in the Arsenal, &c., in the Madras Presidency.

From Military Department, Statement of the Monthly Distribution of the Army in the Bombay Presidency.

From Inspector General of Ordnance, Bengal, No. 1295, dated 14th August 1874, forwarding a statement showing the Establishment employed in taking care of, and superintending the repairs of Camp Equipage during 1870-71 and 1871-72.

Brigadier-General Cell, Commanding.

The Commission met at 11 A. M.

The marginally noted correspondence was submitted.

The Commission proceeded to take the evidence of Commanding Officers.

I. Has generally been at an arsenal station. Does not recollect any difficulty as to getting stores owing to remoteness from an arsenal.

II. Was formerly Quarter Master General of the Bombay Army. Is in favor of the Camp Equipage being in charge of regiments. It is under more thorough care. In arsenals more liable to deterioration. Would recommend that the Camp Equipage be transferred to regiments. Camp Equipage cannot be used except under Quarter Master General's orders.

One advantage of having Camp Equipage in arsenals is that it is concentrated for great emergencies, as for instance when it was wanted for Jacobabad the other day, when that station was flooded. There is Camp Equipage in store for the whole army + a reserve. But this may include the 3rd class tents. Some inconvenience occurs from divided responsibility as regards tent lascars. In Bombay complaints are made as to the withdrawal of lascars from the arsenal.

\* Considers that the repair of tents by the Ordnance Department is a most extravagant system. The bills sent in were enormous, but was unable to find out the reason. When the season is over the Camp Equipage is received into Ordnance Department, they pitch it and estimate for repair. On this, payment is made. When tents are returned the opinion of the Ordnance officer is taken unless something exceptional necessitates the assembling of a Committee. The Quarter Master General examines the estimates and reduces it, and this is passed by Government. The money is drawn on the estimate.

Considers that if the tents were under the regiments, much economy might be effected.

The Quarter Master General obtains permission from Government to purchase tents. A contract is made by Government. Some years ago it was directed that the tents should be of the Bengal pattern, but it was found afterwards that they could be made in Bombay as cheaply in Bengal.\*

The Governor and Commander-in-Chief's Camp Equipage and the Bishop's are not under the Camp Equipage Department. The latter is a civil charge. The Ordnance Department repairs the Commander-in-Chief's Camp Equipage under orders of the Quarter Master General. There is a want of control over the Governor and Bishop's Camp Equipage. Used for all sorts of purposes.

Climate of Bombay very destructive to tents. Does not generally last more than 3 years.

As Quarter Master General had the entire control of the barrack furniture. Is not aware for what reason the Ordnance Department had to make it. Barrack furniture is sent to out-stations from centres of supply. Is quite in favor of having service ammunition in charge of any regiments. Considers that a regiment should be in all respects independent. Considers that a central station magazine would not answer. It is better to put entire confidence in the native army, and apply one rule, which is conducive to efficiency, to all.

Considers that arsenals should not be on the seaboard. Believes that Poona would be a much better position. Kirkee was selected, and a fort was commenced. In view of having all the Military establishment concentrated within a fort, a village was removed at great expense.

3 Companies, Sappers and Miners, were employed for 2 years.

Considers Poona a strategical point. The reserves of the army are there, and any call on the army is made on Poona.

Asscerghur guards a gorge from a low to a high country. It turned Tantia Topee during the mutinies.

Has no large demands. Will furnish a copy of the demands if required. The demands of the Royal Navy go direct to the arsenal.

Captain Giles, Superintendent of Marine.

Copies of demands obtainable in Accounts branch, Military Department.

Demands are made on the Gun Carriage Factory, which has to keep the ships complete. The monitors are under the Marine Department.

Could effect cooperage work and their own repairs.

Could do anything in the way of manufacture and repair in the dockyard.

I. No delay in getting stores.

Colonel Thacker, Commanding 21st Marine Battalion.

II. Does not keep Camp Equipage.\*

\* Each regiment had its own Camp Equipage 40 years ago and kept in regimental charge. The Quarter Master receiving an allowance. On many accounts better to have it in regimental charge. The Bengal system is preferable.

III. 20 rounds in pouches, a small quantity in magazine, the remainder in deposit at the arsenal. No objection to a central station magazine under a European guard.†

† Better in an arsenal than with the men.

IV. All repairs can be effected. Has a trained man who was two years in the arsenal; He is a sepoy, there is an outsider to assist him. Considers it would be better to train boys, but the difficulty is to spare the 'orderly boys' from their education.

I. No delay in obtaining stores. Has been at Kamptee, 10 miles from Nagpore. Was at Tonghoo and had charge of the depôt. Great difficulty in getting stores from Rangoon. The batteries were dependent on the Tonghoo depôt for local supplies. Every kind of material supplied and every repair effected by the Ordnance Department. The change of system has conduced to efficiency by making officers more careful and independent.

Colonel Bond, R. A., Commanding 6th grigade.

II. In Bombay it is in charge of the Ordnance Department.

Has never had reason to complain of the system. Prefers it to be in charge of the Ordnance Department. But if an establishment of lascars is maintained, it would be better if it were in charge of regiments.

Has however found a great inconvenience at the time of marching. The trouble attendant is very great. The men are taken away.

Batteries are able to effect all repairs, and have the means and material for repair as far as regards wood carriage.

Minutes 54, 55 and 56 were read and confirmed and correspondence laid before the Commission.

The Commission adjourned at 4 P. M.



The Commission met at 12 noon at the Military Account Department Office, Poona.

Minute, No. 57 of 20th August 1874, was read and confirmed.

Papers with Military Department, No. 160 of the 4th May 1874, on the pay and position of the warrant officers in manufactory department were re-submitted to the Commission. Minutes by Colonel Hatch and Colonel Stewart were read, and the papers discussed.

It was decided that a report should be drafted to Government to the effect that the Commission considers Warrant and Non-Commissioned Officers, employed in ordnance factories, should on account of the importance of their duties, be allowed to draw an extra departmental staff allowance in addition to the (warrant) pay, Indian warrant allowance, and staff pay of their rank, on the principle recognized in para. 9, G. G. O. of 1868.

That they recommend there should be 3 classes of subordinates in manufacturing establishments, viz., Overseers, 1st and 2nd class, and Assistant Overseers, with a departmental extra staff allowance of Rs. 120, Rs. 60 and Rs. 30 respectively, but the Commission do not recommend that free quarters should be given, and consider Warrant Officers should pay rent for their quarters. That the Commission consider these appointments should be open to Non-Commissioned Officers as well as Warrant Officers.

The grades to be assigned to each factory will of course depend on the extent and importance of its operations, and the Commission recommend that cases similar to these now under reference should be disposed of according to the principle laid down. That to the use of the term "Staff" pay, much of the discussion which has arisen is due. Papers accompanying No. 1544 of the 29th April 1874, from the Military Department G. I., regarding proposed consolidation of the pay of the Storekeepers of the S. A. A. and G. P. Factories in the Bombay Presidency, were re-submitted.

Ordered that a reply should be made to the Government of India that the Commission object to the consolidation of the pay of these subordinates, as a plan which possesses many disadvantages among which is the fact that the services of an employé cannot be retained when he is promoted to a higher warrant grade, and would enjoy a higher rate of pay on rejoining an arsenal. That the Commission also objected to the principle that a man should remain on a fixed salary, and not receive the advantages which increased warrant rank usually gives. The Commission recommend the cases of the men referred to, being settled on the principle laid down in their report on Military Department, No. 160 of the 4th May 1874.

*Minute No. 58, dated 26th August 1874.*

Minutes on the Pay and Allowances of Warrant Officers employed in the Manufacturing Agencies of the Ordnance Department by

Major-General Turner, C. B., R. A.  
Colonel Hatch, R. A.  
Colonel Stewart, R. A.  
Mr. Haliburton.

A copy of this report to be appended.

Papers forwarded with Military Department, No. 1617 of the 29th May 1874, on the revision of the establishment for proving gunpowder and small arm ammunition at Kirkee were submitted and ordered to stand over for the present.

The Commission adjourned at 4 P. M.





The Commission met at 11 A. M. Minute *Minute No. 59, dated 26th August 1874.* No. 58 was read and confirmed.

Draft report on the pay and position of Warrant Officers in the Ordnance Factories of India called for in Military Department, No. 180 of the 4th May 1874, was read and approved.

Draft letter on the pay of Storekeepers in Bombay Presidency as called for in M. D., No. 1544 of the 29th May 1874, was read and approved.

Printed papers compiled and with notes by the Secretary on the Factories, Camp Equipage; and Harness, Saddlery; and 'General Statements' laid before the Commission.

Papers with Military Department, No. 272 of the 6th August 1874, on the question of the promotion and pay of the soldier mechanics at Dum Dum, read and discussed.

Ordered that a report be made in the sense of Colonel Hatch's Minute, dated 26th August 1874, in which the Commission unanimously concur.

The Commission decide to take the papers handed in by the Secretary in the following order:

Small Arm Ammunition Factory, &c.

Gun Powder Factory.

Gun Carriage Factory.

Camp Equipage.

Harness and Saddlery.

Miscellaneous.

Pay of Establishments.



In communication with Colonel Worgan Inspector General of Ordnance, Bombay, it was decided that the Commission would visit the Poona Arsenal first, taking the S. A. A. Factory and Gun Powder Factory, subsequently.

Colonel Worgan to be requested to furnish a plan of the magazine at Neemuch, and a statement of the purposes for which it is required and maintained, and the nature and extent of the work executed by the establishment, a return of which should also be furnished. The I. G. O. to be also asked for all information regarding the establishment of an arsenal at Poona and the papers on the subject of removal of the Gun Carriage Factory, Bombay to Poona or Kirkee.

The Commission adjourned at 4 P. M.

*Minute No. 60, dated 27th August 1874.*

From I. G. O., Madras, No. 2182 dated 12th August 1874, stating that the form to shew the proportion of tents forming the Camp Equipage of the Madras Army cannot be filled up, and furnishing certain information on the subject.

From I. G. O., No. 2181, dated 12th August 1874, stating that the Examiner of Ordnance Accounts is unable, owing to pressure of other work to furnish the statement asked for by the S. O. C., shewing the description of work performed in the Arsenal of the Madras Presidency during the last three years.

From Quarter Master General, Bombay, No. 3502, dated 10th August 1874, Returns duly filled up, the statement to shew the number of tents allowed to the different units of the Army, &c., &c.

The Commission met at 12 noon, Minute 59 was read and confirmed.

Marginally noted Correspondence was laid before the Commission.

In reference to Madras I. G. O., No. 2182 of 12th August 1874, giving cover to Q. M. G.'s, No. 5462 of 7th August 1874.

And Bombay Q. M. G.'s, No. 3502, dated 10th August 1874. The former to be returned for correction and completion. G. O., No. 136, to be returned for latest corrections and to ask why S. S. tents made annually are not entered. And for No. of tents per Regiment, and men in each. With reference to No. 2181 of 8th August 1874, from I. G. O., Madras, giving cover to letter from the Madras Examiner of Ordnance Accounts, a copy of the compilation made by the Bengal Arsenal to be furnished and explanation given, as to how the information is to be furnished.

Papers with Military Department, No. 316 of the 7th August 1874, on the rates to be fixed for Ordnance stores throughout India were discussed.

In Minute 41, under Europe Stores, the following alteration to be made.

W. O.

\* For Woolwich Stores, Woolwich vocabulary rate, Balance sheet No. 2 + 5 per cent., War Office charges.

For contract stores actual cost.

‡ A common rate to be arrived at.

"The values to be recorded in stock books, will be the English cost prices\* average cost‡ of delivery at port say 10 per cent.‡ Omit (as to latter.)

Under "issues to sales of individuals or native states"—for "cost of delivery," read "transport charges"—(omit 5 per cent.,) 10 per cent., fixed on gross amount of Stock book and transport charges.

Under Local supplies.

Local or contract rates to be entered in Vocabulary and no price given.\*

The Examiner not being present to give information required in regard to local supplies.

The Commission adjourned at 4 p. m.

Issues to troops.

The Commission met at 10-30 A. M.

*Minute No. 61, dated 28th August 1874.*

Draft report on the pay, &c., of Soldier Mechanics, Dum Dum S. A. A, Factory laid before the Commission and approved.

Marginally noted cover laid before the Commission. Adjourned to the Poona Arsenal at 12 noon. The Arsenal is in charge of Captain Spring, R. A. The books kept up in the Arsenal are as given in list D, attached. The principal books as marked were examined. A copy of the morning report was asked for.\* Colonel Worgan, R. A., Inspector General of Ordnance and Magazine, Bombay Presidency, attended the Commission. He stated that the Poona Arsenal receives and issues all powder and ammunition for the army, a duty which was formerly done by the Grand Arsenal.

Camp Equipage is kept up for about 2,000 British and 5 to 6,000 native soldiers.

Tent Lascars under the Quarter Master General are allotted at 4 per 112 men British Infantry Regiment.

A statement of Camp Equipage, &c., was handed in, dated the 21st August marked B. It was noted that the No. of indents given in answer to question 24, p. 15. Answer to questions to Commissaries of Ordnance was the total of 3 years, so that the totals must be divided by 3 to give the yearly average.

The numbers also include receiving indents, and the number of indents received from each corps dependent on the Poona Arsenal was entered by the Commission, and a note was made of 1 or 2 instances. On 19th February 1874 the 68th Regiment made a separate indent. On the 24th February 3 separate indents. On the 19th June they had 7 separate indents.

It was also noted that the conversion statement book included material and labour for every package—so much for nails, paint, &c., and so much for the work of the man or men closing the package.

On the question of Audit remarks, the Commissary of Ordnance gave it as his opinion, that the writing back of material which had been actually expended, gave rise to a system of adapting the quantities received in a conversion statement to the quantities considered correct by the Examiner, and thus did not represent the actual material expended.

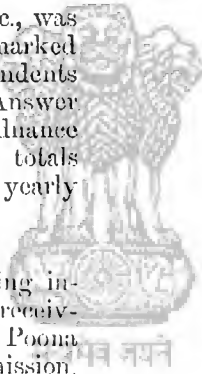
I The Commission visited the Magazine containing S. A. ammunition and a small quantity of powder, (the bulk of ammunition being kept at Kirkee.)

From Military Department No. 1106, dated 21st August, 1874, forwarding copy of a letter to the Bombay Government containing a decision on the question of the reserve quantity of material for the manufacture of snider ammunition to be kept in store at Kirkee.

From Military Department, No. 1110, dated 21st August 1874, forwarding for consideration a reference on the subject of the valuation of articles of Europe supply, as shewn in the new vocabulary for India.

\* Marked C.

\* Memo. of routine of work handed in by the Commissary of Ordnance and attached A.



A statement handed in by the Commission marked E., it appears that the total annual average of drawing indents is 1437 instead of

Ordnance stores.....	1,865
Camp Equipage.....	377½
Barrack Stores.....	84½

Total ... 2,327

2. The Camp Equipage Branch, this was in an open shed.

3. The Accoutrements Branch.

4. Armoury Workshops.

5. Petty Stores.

6. Ordnance and Laboratory and the Receiving and Issuing Branch.

The Commission also visited the Gun Carriage Factory workshops which now do any work required for the arsenal.

The Commission adjourned at 4 P. M.



The Commission met at 2 p. m., Minute 61 was read and confirmed.

*Minute No. 62, dated 29th August 1874.*

Marginally noted papers were laid before the Commission.

Memo. by Colonel Worgan, Inspector General of Ordnance, Bombay, regarding the Necmuck Dept., dated 28th August 1874.

With reference to the question of charges for stores the Examiner O. A. Madras to be asked for information showing the average annual percentage of freight and landing charges on the value of stores of ordnance supply during the past three years.

From Military Department, No. 1327, dated 25th August 1874, forwarding proceedings of the Madras Government regarding the improvements and additions required in the Nagpore Magazine.

Memo. by Colonel Worgan, Inspector General of Ordnance, Bombay, regarding the removal of the Gun Carriage Factory, from Bamlay to the Deccan.

A copy of the form given by the Ordnance Examiner Bengal to be given.

The Commission proceeded to discuss the printed papers on ammunition and the S. A. A. Factories.

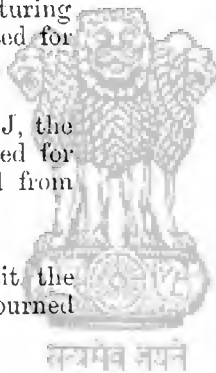
Colonel Stewart was asked to obtain the highest daily and annual out-turn of ammunition at Madras.

Colonel Hatch undertook the correction of the table "requirements of the army."

Table at p. 10, highest manufacturing capacity of factories to be substituted for that in p. 3.

In reference to tabular statement J, the cost of transport per ton to be asked for from Fort William to Madras, and from Poona to Madras.

The Commission decided to visit the S. A. A. Factory on Tuesday, adjourned at 5 p. m.



Minute No. 63, dated 31st August 1874.

The Commission met at 10 A. M.

*The question to stand as follows :—*

1. How many rounds of ball Snider ammunition can you make daily and annually if employed on that description of S. A. ammunition only.

2. How many rounds of balled Snider ammunition can you make if you are called on to make at the same time  $\frac{12,000,000}{8,000,000}$  of blank Snider ammunition annually.

It is to be understood that the factory will work at the ordinary working hours and with your existing plant, and that no other kinds of S. A. ammunition will be manufactured.

Minute 62 read and confirmed. The discussion of the papers on ammunition and S. A. A. Factories was resumed.

It was decided to ask for information from Dum Dum to Kirkee, showing what amount could be turned out daily and yearly of Snider ball Cartridges, and of " " blank " the manufacture of all other heads of ammunition being stopped.

With reference to K "delivered cost of raw material" it was determined to take the English prices, and show the delivered cost at factory by the addition of percentage charges for freight and transport. The other items in the lists to be expunged except the main articles of local supply.

An additional statement to be got from the Examiner Bengal, showing the cost of transport for ammunition and powder.

The Commission adjourned at 4 P.M.



The Commission met at 11 A. M., at the S. A. Ammunition Factory, Kirkee, in charge of Major Wake, R. A., Superintendent.

*Minute No. 61, dated 31st September 1874.*

Colonel Worgan, R. A., Inspector General of Ordnance and Magazine, Bombay, attended the Commission.

From Inspector General of Ordnance, Poona, No. 5503, dated 29th August 1874, forwarding a statement shewing the store transactions in the Arsenal and Depôts of the Bombay Presidency.

The question of the out-turn of the factory was discussed. The Superintendent stated that working  $7\frac{1}{2}$  hours a day he could turn out 35,000 rounds of Snider ball Cartridges.

Working 10 hours per diem 50,000:— and with the additional buildings and the extra machines stated in his report to the Commission, required to complete the factory at an estimated cost of Rs. 130,000—60 or 70,000 rounds per diem.

At present the factory is working at 40,000 rounds per diem, but does not consider it safe to estimate more than 35,000 rounds Can make in addition 10,000 blank 280 working days per annum. With extra machines as entered in appendix, ammunition and only manufacturing Snider could turn out

60,000 ball Snider,

30,000 blank „ per diem.

Could turn out 100,000 caps and anvils which is all that is required to complete worn recovered cases of snider cartridges. The Superintendent was of opinion that it would be a difficult matter to fill cases in arsenals, so much care is required in the capping.

Major Wake stated that he was in difficulty with regard to his Engineers, and the terms necessary to induce them to re-engage after expiry of their covenant.

On the question of establishment, he stated that the present supervision was sufficient for an out-turn of 75,000 a day, but that he considered more skilled labour necessary. He believed that it would be economical to pay high wages to men from England, as the work they do is so much greater than that done by natives and those were procured in the local market. The Chinamen carpenters though paid higher than natives work better and are more economical.

The Superintendent stated that he preferred civilian mechanics and that his experience led him to form an unfavorable opinion of soldier-mechanics, who had their regiments, and the money they would earn when with them, to fall back upon.

The Superintendent considers that there should be a permanent establishment of Europeans and natives, as nucleus of 130 including overseers. Suffers very much from his extra men and boys, after they have become good workmen being tempted away to the railway or cotton mills. The difficulty of retaining men is enhanced by

the fact that there is no village near for his workmen to live in, and no new building is allowed within 800 yards radius. He wishes to obtain a plot of ground upon which the men could hut themselves. The Superintendent also brought to the notice of the Commission the fact that there is no enclosure wall, but merely a weak palisade, which affords no security against thieving. The matter has been before Government about 4 years. The Superintendent also stated that he had strongly urged the extension of the area of supply of the factory as the supply of the Bombay Army alone was not sufficient demand to keep his factory working. The Commission inspected the books kept up (a list of which is given in Memo. furnished by the Superintendent.) The Superintendent explained the system of check of workmen. The Labour Conversion report books, 37 in number, show the labour done on a certain operation for each machine during the month. The material expended is shown in the Store Branch Books, and the two are continued in the office to form the Conversion Statement. There is a check both in the manufacturing and in the store branch.

Accounts are rendered quarterly.

The Superintendent stated that he considered the head of a factory should have more direct responsibility in economy of manufacture, and should be allowed to purchase from local market, and not have to draw supplies through arsenals. Had introduced piece-work with some success.

The Commission then inspected the manufacture of Snider cartridges. The workshops appeared somewhat crowded. Visited the petty stores, the store branch, and inspected the books of the store branch. A "work mark" is used to reduce clerical labour. Letters A—N signify the operations of making the component parts of the cartridge—as base discs, &c. Numbers 1—18 repairs, cleaning, forgings, making friction tubes, &c. The same work-mark is used in the labour book, so that both labour and material are easily put together in the office. The store room appeared insufficient in size, and the quantity of material in store very small.

The Commission visited the laboratory buildings, where the operations of capping, cap filling, building, &c., are carried on.

Adjourned at 4 P.M.



The Commission met at 1 P.M.

*Minute No. 65, dated 2nd September 1874.*

Minutes 63 and 64 read and confirmed.

With reference to the remark in Minute 64, on the want of a wall and deficiencies of store accommodation, a special report to be made to the Government of India, recommending a wall and store room to be built and additional office room provided, as the space now occupied by the office reduces the space available for shafting. The P. W. D., Bombay, to be asked for all papers, plans and estimates showing

1st. The cost of proposals for turning the Poona Arsenal into a Gun Carriage Factory.

2nd. For providing(a) a large arsenal at Kirkee.

(b) A small arsenal at Kirkee.

(c) A Gun Carriage Factory at Kirkee.

(d) Cost of proposed fort with plan.

The Commission record their opinion of the factory as follows :

That the factory appears to be in good working order, and that the system of factory account is clear and simple.

Observations also recorded and entered under the column Kirkee in the S. A. A. Factory in appendix B.

Ordered that the daily figure of merit obtained in the proof of cartridges at the two factories of Dum Dum. Kirkee be asked for from August 1874.

Ordered that the Secretary to Government of Bombay, Military Department, be asked for. 1st. The papers, &c., regarding proposed reduction of Bombay Arsenals, &c., in 1860.

2nd. The system of supply of barrack furniture, and the reasons which led to the change of supply to the Ordnance Department.

The Commission adjourned at 5 P. M.

*Minute No. 56, dated 3rd September 1874.*

The Commission met at 11 A. M. at the Laboratory establishment, Kirkee. This is in a hired bungalow in the Cantonment of Kirkee. The establishment consists of

3 Magazine Serjeants.

1 Tindal.

12 Store Lascars.

6 Permanent laborers.

The books were examined.

Statement of establishment and cost and out-turn entered marked A under Ammunition.

The data on which conversion statements are framed have been fixed for many years.

Any balance of labor unaccounted for under conversion is written off to "interior economy."

The Commission proceeded to the Powder and Cartridge Proving Houses near the Gun Powder Factory.

The establishment at present consists of  
1 civilian mechanic, a fitter and turner, whose spare time is utilized in the S. A. A. Factory.

1 clerk employed at the S. A. A. Factory

1 native foreman.

1 firer.

1 marker.

2 laborers.

1 watchman.

The number of cartridges fired daily is about 20 on the average, and they are occasionally tested for velocity by Boulangés instrument. Powder tested twice a week.

With the 8-inch gun, and testing for pressures, the work will be considerably increased

\* Dhol stalk, received 800 cwt. but wanted 6,000 cwt. obtained from S. Concan.

Guzerati dhol stalk  $5\frac{1}{2}$  Rs. per cwt. Through his own people obtained some at 2 Rs. per cwt.

45,513 lbs. of dhol stalk gave 11,110 lbs. charcoal.

The Commission proceeded to the Powder Works and visited the workshops, store rooms, saltpetre refinery, incorporating house, &c. They subsequently visited the office and inspected the books which are entered in the Memo. 783, dated 11th August 1874 from the Superintendent.\* The following observations were noted: Under the "General Charges" 5 per cent. is charged for buildings and plant. Condemned stores are sold by subordinate officers of the Bombay Ordnance Department.

Sulphur is obtainable from Sind, but there is no sulphur refinery at Kirkee. Receives sulphur from England refined at Rs. 8-5-9 per cwt.

Saltpetre refined, Rs. 15-10-4 per cwt.

„ grough, Rs. 9-8-0 per cwt.

R. F. G. has been made since 4th February 1874.

The highest out-turn of the factory will be

R. F. G. 25,000 lbs. per month, or 1,000 lbs. per diem,

or R. L. G. 1,500 lbs. per diem.

The Superintendent stated that he had reduced the holidays to those allowed to Europeans, so that he now gets 300 working days in the year. 7 A. M. to 4-30 P. M. is the working day. Millmen come at 6 to clean up everything before they begin. Laborers when required work after-hours.

Those employed on the Incorporating Mills work 10 hours. The others go at 2 or 3 o'clock. No difficulty experienced as to labour—or in procuring men. The other houses would suffice for another group of mills, with additional establishment for the mills and 2 press houses.

In the manufacture of R. L. G. this could not be done, but work could be carried on in alternate weeks.

The establishment is all “fixed” and costs Rupees 6,758 per mensem.

The Commission adjourned at 5 P. M.

*Minute No. 67, dated 4th September 1874.*

The Commission met at 11 A. M., and visited the office of the Examiner of Ordnance Accounts.

Colonel Harrison, Officiating Controller of Military Accounts, was present. In discussing the question of the prices paid by Factories for ordnance supplies; it appeared that they are charged for imported articles, English price, freight + 3 per cent. landing charges + transport. If a factory draws stores from an arsenal, it is charged at "book rate" and not for transport to the arsenal.

The "book rate" is cost of stores in Bombay (including freight) + 3 per cent. for landing charges + 5 per cent., the annual average cost of transport.

The Gun Carriage Factory makes its own annual rates. Makes its own indent for I. G. O., but stores are received direct, including tools, and do not pass through the arsenal.

The Ordnance Examiner stated in reference to the practice of "writing back" stores expended in an arsenal, that it was never ordered, but that an explanation was called for from the arsenal, which if the expenditure was admitted, would inform the Examiner that "it would be written back." After considerable discussion on the system of auditing Ordnance Accounts, the Controller promised to submit a Memorandum on the subject.

The Controller was of opinion that the system of obtaining barrack furniture for the Ordnance Department was expensive and unnecessary. He considered that the articles should be obtained on contract, or on contingent bills.

Adjourned at 3 P. M.

The Commission met at the Kurrachee Ordnance Depôt. *Minute No. 68, dated 14th September 1874.*

They inspected  
 Harness, Saddlery accoutrements,  
 Armoury.  
 Petty Stores Branch.  
 Gun-sheds.  
 Camp Equipage.  
 Ammunition.

The Deputy Assistant Commissary in charge reported himself sick.

The Books, &c., as per list annexed were examined. It appeared that stores from England for Hyderabad and the Punjab do not as a rule pass through the depôt. It was stated that arms, &c., for troops at Kurrachee go to Hyderabad in the first instance, and are then brought back to Kurrachee, and sometimes cases are not even opened at Hyderabad. The Commissariat land all stores at Kemari, where they have an establishment for this purpose.

No barrack work is done by the depôt. When Artificers are required they are hired from the bazaar, and are found to be efficient.

Barrack furniture made by contract for the Barrack Department.

The British Regiment repairs its own arms, but the browning of the arms, for the battery, &c., is done at Hyderabad.

It appeared to the Commission that the Store-rooms were good and convenient and afforded much more storage room than required for the troops at Kurrachee. Some extension of the depôt might also, it was remarked, be made by additional buildings in front of the gateway, and by taking in the buildings in rear adjoining the arsenal now forming the Branch stores, within the area enclosed by the palisade, and by raising the roof of the present buildings which appeared to be substantially built.

The Commission discussed the position of Kurrachee as a base of operations and its wants in regard to an arsenal.

In the evening the Commission inspected ground E of the Napier Barracks as probable sites for an arsenal.

Adjourned at 6-30 P. M.

*Minute No. 69, dated 15th September 1874.*

Colonel Berry, Commanding 56th Regiment.

The Commission met at 11-30 A. M., at the R. A. Mess, Kurrachee, to take the evidence of Commanding Officers.

I. From the Hyderabad Arsenal. No delay. Stationed at Nusseerabad, but received main supplies from Mhow. Does not recollect any loss of efficiency owing to distance of an arsenal. Draws stores as Regimental Equipment is expended.

## II. No Camp Equipage.

Order or indent has to be countersigned by G. O. Considers that Camp Equipage should be drawn from an arsenal as required, unless the regiment is part of a flying column or liable to move.

The only advantage in the Bengal system is that Camp Equipage is more rapidly procurable.

No store rooms for Camp Equipage. Frequently saw Camp Equipage at the quarter guards of regiments in Bengal covered with tarpaulins.

Mr Leech, Quarter Master.

III. 200 rounds in addition to ball and blank. In the Regimental magazine. At Poona it was in the arsenal in deposit. Just as convenient a system. No guard was necessary.

Would rather have ammunition with the Regiment.

Unless for a reserve, does not think it would be good to have a Central Magazine.

IV. Very nearly. Some repairs cannot be effected. The armourer has not sufficient tools to effect all repairs. A barrel for instance has to be sent to an arsenal. Scratching of barrels about the only thing which cannot be done regimentally.

V. Yes. Carpenters, Smiths, Cabinet-makers, Turners, Tailors, &c., and can take the whole of the Barrack furniture contracts.

At Poona used to repair barrack furniture for the arsenal.

Charges made out of 3 items.

Material.

Labour.

General charge in favor of the workshops on both. About 5 per cent. on total.

Prices fixed by the Commissariat Officers.

Has about 13 men and 5 apprentices.

Excused ordinary roll-call, but do all other duties. Does the undertaking work. The men working in the shops are healthy and well behaved.

In Bengal a Station Committee assisted by Barrack Master fix prices for repairs of articles returned.

Quarter Master Leech thinks, an average might be taken of repairs as effected by arsenals all over India, and the price which should be given to troops obtained in this way.

Ordnance stores for Ferozepore handed over straight to Railway at Koemaree Bunder. No difficulties. Sends package list to Ordnance Officer at Ferozepore. Receipts returned show the state of contents.

Major Keays, Assistant Commissary General.

Plenty of facilities. 3 ton crane can get loan of 2, 3 ton cranes and railway 7 ton sheers.

Lifts goods out of the barges, (60 to 70 tons) which belong to Landing and Shipping Company, the Commissariat Contractors.

The subordinate of Commissariat Department at Kotree has nothing to do with stores in transit from Ferozepore.

Thinks the Ordnance Department could make their own arrangements for landing stores as well as Commissariat.

Has a European always at Koemaree receiving stores. Does not think that any confusion would result from the Ordnance Department being their own Agents. Does not know that there would be any saving to the State.

There would be a lessening of correspondence between the two Departments.

Might result in a slight reduction of the extra establishment of Inspectors necessary.

Before the arrival of 56th Regiment, Barrack furniture was repaired and made by contract.

The Commissariat Officer frames an estimate and checks the rates, then offers the estimate to the Regiment after consultation with Barrack Master. Much competition in Kurrachee. Thinks that the Ordnance Department can do it better and more satisfactorily. But the furniture could be made by contract or regiments under Commissariat arrangement.

Can procure camels easily. 1,200 in a fortnight. 185 bullocks kept up, 40 carts always available. Each cart 800 lbs.

I. From Kurrachee depôt. No delay. At present drawing sniders, but can get no ammunition.

Colonel Hogg, 1st Belooch Regiment.

II. No tents, draws them on the march. Never had any delay or inconvenience. When Camp Equipage is drawn or returned,

a European officer is sent. Actual deficiencies only made good, if Ordnance Department object, and the charge is not admitted by the regiment, but cannot recollect any occasion when this was necessary. Station Committee is convened. Does not think it desirable to have Camp Equipage in possession of regiment. Belongs to a local corps and has not to make long marches. Merely from Kurrachee to Hyderabad and vice versa.

III. 20 rounds service.

90 rounds practice.

Balance of service ammunition is kept in arsenal in depôt. No regimental Magazine. A dry room. No inconvenience in it being kept in the depôt. No delay in getting it out.

Does not object on principle to have the whole of ammunition 200 rounds in regiment. Does not think a central station magazine would be good.

IV. Has 1 maistry and 2 sepoys under training. The maistry was trained in an arsenal, can do all repairs to arms.

All repairs can be done by regimental workmen; and browning also. Cannot say as to repair of Snider arms. Is independent of an arsenal.

#### I.—*Camp Equipage.*

Tents supplied by Contractor in Bombay sanctioned by Government. Quartermaster General makes the requisitions. Tents when supplied surveyed by a Committee. Tents compared with the pattern.

The Quartermaster General settles the proportion of tents, generally a little more than what is required for the strength of the troops.

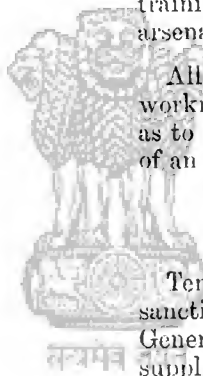
Camp Equipage supplied on indents to troops, indents passed by Deputy Assistant Quartermaster General.

The "Sind Frontier Force" provides its own Camp Equipage. Lately Commanding Officers have insisted on men having tentô d'abri.

The advantages of the Bombay system are that you do not want storage room with regiments. The tent lascars being under good supervision can repair tents better than in regiments, and when not employed can do work in arsenals.

If cholera breaks out at a station where each regiment has its own, you crowd regiment, unless you take from each regiment, as in ordinary occasions men are closer than in cholera time, and followers at the latter time must be provided with tents. In a case at a station, cholera broke out in 1859

Captain Adams, D. A. Q. M. Genl.





and successively in Native Infantry and Artillery. If the tents had been with the regiment, then there would not have been enough Camp Equipage.

At Neemuch the order was given at 8 p. M., and the troops were out at 9 A. M. the next morning.

The proportion of tents kept up in the Bombay Presidency is larger than for the actual strength.

Ships can lay within  $2\frac{1}{2}$  miles off Cantonment, or 1 mile west of Manora Point, off Clifton.

Communications to Deesa by Hyderabad and Tatta. Never been used except in Afghanistan campaign by artillery.

Later on a battery to Deesa, by shipping at Mandavce.

Route not practicable for a large force. One or two routes to Hyderabad from Kurra-  
chee, but only one really good and practicable and one by Tatta.

I. From Hyderabad, sometimes delay when they have to get stores from Bombay.

Colonel Hastings, Royal Artillery, Commanding  
Royal Artillery, Sind.  
Major Worsley, R. A., Commanding B-18, R. A.

Numdahs not in store at Hyderabad, and had to be got from Bombay, 2 months' delay.

Frequently could not get stores from arsenal at Peshawur had a battery on the English system.

Colonel H.

Was at Umritsur, never had any trouble. Also at Meerut, Delhi, Bareilly, well and easily supplied.

II. Had his own Camp Equipage. The Commanding Officer is more likely to take care of it, and easy to get. In Bombay Presidency no experience of an emergency. Prefers Bengal system.

Colonel H.

Never found any difficulty. Can get Camp Equipage before transport generally. Great difficulty as to getting camels. On one occasion was delayed days and days for camels.

Major W.

IV. All repairs can be effected, the only difficulty is with the new saddles. Can effect repairs. Repaired a perch which had been twisted, taking it to pieces. The Artificers are competent men.

All material is not easily procurable at all stations\* as leather.

\* Leather must be obtained from Bombay.  
Colonel H.

Had Bombay harness† at Rawul Pindie, found it very good, and wore well, as well as the English harness received afterwards.

† Note by Colonel Hatch  
It was contract harness.

Considers that it is a misfortune, the chief Scind arsenal should be on the other side of the Indus, i. e., on the south or left bank.

The Commission adjourned at 3 P. M.

*Minute No. 79, dated 17th September 1874.*

Commission met at 6 A. M. at the arsenal. Hyderabad, Sind, in charge of Captain Caldecott, Royal Artillery,

The Commission visited the workshops or artificers' branch in charge of a Conductor (on sick leave to Kurrachee) assisted by a magazine Serjeant. Armoury, accoutrements, harness and saddlery, Camp Equipage in charge of a Conductor. The ordinary reserve of arms is 1,420. The ordnance branch, gun-sheds with 1 reserve S. B. battery, 1 heavy field battery, 2nd line of wagons of the field battery at Hyderabad, and spare garrison carriages.

The Laboratory under a Sub-Conductor assisted by a Magazine Serjeant.

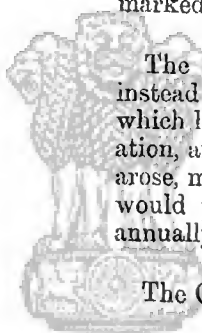
Petty stores branch under a Sub-Conductor assisted by a Magazine Serjeant.

Receiving and issuing branch under a Permanent Conductor.

The Commission visited the office and inspected the books kept up as per list marked A.

The Commissary of Ordnance stated that instead of the "monthly list of remains" which he considered conveyed little information, and upon which when any question arose, much correspondence took place, he would prefer the arsenal ledger being sent annually to be examined.

The Commission adjourned at 8-30 P. M.



सत्यमेव जयते

The Commission met at 11 A. M. at *Minute No. 71, dated 18th September 1874.*  
Hyderabad.

Minutes, 66, 67, 68, 69, and 70, were read and confirmed.

With reference to Minute 67 ordered that enquiry be made on re-visiting Poona as to the meaning of "book rate" and the percentage charged for transport, &c.

Amended report on certain deficiencies in the S. A. A. Factory, Kirkee, was read and adopted.

Papers regarding the requirements of India in gunpowder and the expenditure, with tabulated statement drawn up by Colonel W. S. Hatch, Royal Artillery, were laid before the Commission and ordered to stand over for the present. Information to be obtained showing the stock of powder in store on the 1st April 1874.

The Commission adjourned at 1 P. M.



*Minute No. 72, dated 21st September 1874.*

The Commission met at 7 A. M. at Kur-rachee and visited the Napier barracks, work-shops, and Quartermaster's stores, 56th Regt., Colonel Berry, Commanding. A complaint was made that out of 1,000 rounds Snider ball cartridges mark IX made at Kirkee. 200 cartridges missed fire, and several bullets reported to have fallen short. Samples of cartridges produced from which it appeared that the caps had been driven in by the hammer, without causing explosion. Decided to report to the Inspector General of Ordnance, Bombay, and request that the result of the enquiry may be reported to the Commission.

Adjourned at 8 A. M.

Re-assembled at 11 A. M.

Minute 71, read and confirmed.

Papers from the Executive Commissariat Officer, read.

Extract from letter by General Jacob, Political Superintendent, on the positions of arsenals in Scinde read.

Correspondence forwarded from the Bombay Government, in reference to the reduction of arsenals in 1860, was read.

Correspondence on the defences and positions proposed for arsenal and fort at Kur-rachee, furnished by the General Officer commanding Scind district, read.

Colonel Woolcombe's and Captain Merri-man's opinions were specially noted. Also Sir W. Mansfield's remarks about the Ahmedabad and Nusseerabad depôts.

The Commission adjourned at 1-15 P. M.

*Minute No. 73, dated 25th September 1874.*

The Commission met at the Dockyard, Bombay, at 2 P. M., and visited the factory, store department and building yard.

The capacity of the dockyard far exceeds its present requirements and would probably afford accommodation for stores of other departments in case of necessity.



*Minute No. 74, dated 26th September 1874.*

The Commission met at 11 A. M. at the dockyard and accompanied by Colonel Bond, Royal Artillery, Commanding Royal Artillery, Bombay District, and Captain Bythesa, V. C., Royal Artillery, Consulting Naval Officer to the Government of India, visited the Harbour defences ; middle ground, Oyster Rock, and Cross Island batteries. The President and Members also visited one of the turret ships and the Hydraulic Lift.

Adjourned at 7 P. M.



The Commission met at 7-30 A. M. at the Ordnance Depôt, Ahmedabad, in charge of Captain Bunyer, Deputy Commissary of Ordnance.

*Minute No. 75, dated 29th September 1874.*

A "present state" of the establishment of date 29th September 1874, was handed in and attached (marked A.\*)

\*File "Ahmedabad Depôt."

The Commission visited the Armoury, Accoutrement and Harness and Saddlery Branch, under charge of a Magazine Serjeant.

Camp Equipage, Petty Store Branch and Workshop under a Sub-Conductor. Sufficient Camp Equipage is kept for the troops at Ahmedabad only. The Deputy Commissary stated that on the formation of a rest camp at Balsar on the Bombay and Baroda line of railway, he has to supply the tents, and that consequently the troops at Ahmedabad are left without their proper complement. In the case of a regiment ordered to Deesa, the Camp Equipage is supplied from this depôt, which also receives it when the British regiment leaves the division via Ahmedabad by rail.

In the workshops only 1 permanent "maistry" is entertained, extra men, carpenters, smiths, tailors, &c., being obtained from the bazaar when required.

As Deesa is not supplied from Ahmedabad (except with barrack stores), little work is done for regiments or departments, &c., outside. The chief work is in repairing repairable articles. Rarely does anything for the battery.

The number of extra artificers employed daily is 15.\*

\* The Deputy Commissary stated that he had sometimes entered into contracts for the supply of Barrack furniture and other stores.

The Commission visited the sheds containing the carriages for 2nd line of wagons of the field battery and the carriages for reserve Field Battery.

The Commission visited the laboratory room, Magazines; the quantity of ammunition and powder in store and the capacity for storage is given in copy of the "Annual return of gunpowder, &c.," marked B, and attached.†

File "Ahmedabad Depôt."

Blank ammunition is made up in the depôt for Native Infantry and Royal Artillery.

The Commission visited the Ordnance Branch, which with the magazines is in charge of a Magazine Serjeant.

They inspected the office books as per list marked C.\* 3 clerks are employed in the office.

\* File "Ahmedabad Depôt."

It appeared that when indents cannot be complied with in full, the stores due are obtained from the Grand Arsenal, this dépôt indenting for them. The Commission considered that the better plan would be for the indent to be forwarded for direct compliance from the G. A. to the indenting party with the demands remaining due.

\* Note. In reference to the answer to question 24 to Commissaries of Ordnance, Captain Bunyer was requested to have it corrected showing only the number of drawing indents. Statement marked D.

The Commission noted that the buildings were well adapted for their purpose, commodious, and the stores well arranged.

Adjourned at 10-15 A. M.





Minutes and papers connected with *Minute No. 75A, dated 30th October 1874.*  
Ahmedabad Depôt, circulated.

Plans of Ahmedabad City and Cantonment and Arsenal circulated and information in regard to the proposed fort of refuge at Ahmedabad, laid before the Commission by the Executive Engineer at the request of General Sir E. Russell, Commanding Northern Division. The proposal made in 1864 by General Straubenzeer and the Executive Engineer, was to construct a redoubt on the race course on the southward of the present barracks. This redoubt was to contain the arsenal, &c.

The proposal to fortify the Bhadda emanated from the Commander-in-Chief in 1863.

Plans for the redoubt were made and submitted to the Commander-in-Chief, but disapproved. Amended plans were afterwards made and submitted, but no decision has been passed about them. Sir William Mansfield in 1863 proposed to strengthen the enclosure called the Bhadda, inside the city as a place of refuge, and an officer specially detailed for the duty made plans and estimates of cost of carrying this proposal out, but nothing has been done.

Calls have been made on the Executive Engineer and the plans were revised and sent to the Superintending Engineer a year and half ago, but nothing further has been heard of the matter.



*Minute No. 76, dated 2nd October 1874.*

The Commission met at the Grand Arsenal, Bombay, at 8-30 A. M.

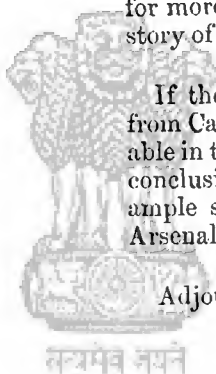
Visited the store-rooms of the arsenal with a view to seeing what space is available for extending the storage accommodation of the arsenal in the event of it being required.

The Commission observed that by the re-arrangement of some of the store-rooms and buildings, the addition of upper stories to others and the utilization of the space now occupied by the warrant officers, suitable quarters being provided elsewhere, considerable additional storage room could be obtained. The inner partition wall between the north-east and north-west bastions might be pulled down and would give space, air and light. Space formerly belonging to the arsenal and now in the Mint premises and apparently not utilized, might be restored.

One or two of the store-houses require improvement in ventilation and protection from damp, even if no additional storage is required. It was noted that there is room for more racks and almirahs in the upper story of the building marked S, on the plan.

If the harness and saddlery be supplied from Cawnpore, there would be space available in the present workshops. The general conclusion was arrived at, that there is ample space for the purposes of a 1st class Arsenal.

Adjourned at 12 noon.



The Commission met at Poona at 11 A.M.  
Minute No. 76 of 2nd October 1874, read  
and confirmed.

Minute No. 77, dated 5th October 1874.

Papers and correspondences recently received laid before the Commission. With reference to Military Department, No. 165 of the 14th August 1874 about Nagpore, reply to be made that the Commission cannot make any positive recommendation in regard to this arsenal until they are completed by the Military Member, but that they recommend pending their final report that nothing shall be done to the buildings of the arsenal, beyond what is absolutely required for their safety.

With reference to Quartermaster General, Bombay, <sup>12-16</sup> 4040 of 7th September 1874, the meaning of the explanatory note in the return to be asked for. Correspondence about extension of S. A. A. Factory, Kirkee, read and to be circulated.

With reference to No. 6077 of 8th September 1874, Quartermaster-General, Madras, ordered that it be returned for correction.

Inspector General of Ordnance, Madras, to be asked for a return showing total cost of the repair of tents in the Madras Presidency, including labor and material for 1870-71 and 1871-72.

The Commission decided to ask for the following officers to meet them on Wednesday the 7th Instant at 11 A. M., and resolved that they would visit the magazines and store-rooms afterwards.

General Grant.

Deputy Quartermaster-General.

Colonel Hughes, R. H. A.

Major Hall, R. A.

1 Commanding Officer of British Regt.

1 Comdg. Officer, Native Infantry.

It was decided to leave Poona for Hyderabad, Deccan, on Friday the 9th Instant.

The business to be done was discussed and it was resolved.

#### I.—*Bombay and Poona.*

##### (a) Grand Arsenal.

To call for information in regard to the deterioration of stores in the climate of Bombay.

To obtain the opinion of the Military authorities on the relative value of Bombay and Poona as a base for military operations and the assemblage and equipment of an

army, also to ask the Secretary to Government, Military Department, for the strategical reasons which led to the selection of Poona for a large arsenal, &c.

(b) Gun Carriage Factory.

To ask for an estimate of the cost of establishing it in the buildings now occupied by the Poona Arsenal.

(c) To ask for estimate of cost of the projected fort at Kirkee.

II. Aden Arsenal.

Belgaum.

Neemuch Depôt.

Ahmednuggur Depôt.

Sholapore Depôt.

To call for information on the points noted in memo. attached, marked A.

III. *Barrack Furniture.*

To go through the papers and decide whether more information is required, *e. g.*, cost of transport to stations. Opinion of Public Works Department, Bombay, as to Executive Engineer performing the work now done by the Ordnance Department.

IV. The following printed papers supplemented by others received since date of compilation, to be gone through.

(a). Ammunition.

(b). Gun Powder Factories.

(d). Camp Equipage.

(e). Harness and Saddlery.

(f). Pay of Establishment, &c.

(g). Freight and transport.

(h). General and Miscellaneous.

V. Information to be obtained about Cannanore, Rangoon, &c.

The Madras Government to be asked to let the Commission have copies of any correspondence having reference to an entrenched camp at Bangalore to hold Ordnance Magazine, &c.

VI. Generally, the Commission decide, to determine if they require additional information.

Adjourned at 5 P. M.

The Commission met at 11 A. M. Minutes 72—76 were read and confirmed.

*Minute No. 78, dated 7th October 1874.*

Correspondence recently received was laid before the Commission and discussed. Col. Harrison, Controller, Mil. Acconnts, and Major Turner, Examiner Ordnance Accounts, examined on question of arsenal accounts. It was suggested that the annual statement of remains required from arsenals was an unnecessary document. That it should suffice for the arsenal to send in monthly the vouchers relating to its transactions, with a statement of the remains of all articles in which transactions have occurred. That at the end of the year the Arsenal General Ledger shall be forwarded to the Auditors, the branch ledgers sufficing for all references in the arsenal. The Examiner considered that there would be no difficulty in carrying out this system, but he thought it would impose additional labor on and entail increased establishment in his office, without a corresponding decrease in arsenal establishment.

The Commission consider that on principle the clerical work of Executive Departments should be kept down to a minimum, in order, that when occasion requires, all their energies may be devoted to the duties for which they exist, by supplying the army with the requirements with which they deal; and that all mere clerical work such as statistical returns should devolve on Head Quarter offices which have no duties but those of auditing and compiling accounts. Decided to enquire further into this question at Madras and Calcutta.

Major Turner submitted a report on Factory accounts which was read and generally concurred in.

The Commission considered and discussed the papers on ammunition and S. A. A. Factories, and with reference to No. 663 M. of the 11th September 1874 from Inspector General of Ordnance, Bengal, it was decided to ask for information showing the cost of the additional machinery required for the factories of Dum Dum and Kirkee to increase the out-turn.

The Commission adjourned at 4-30 P. M.

*Minute No. 79, dated 7th October 1874.*

Colonel Pogson, Commanding 17th Native Infantry.

The Commission met at 11 A. M. at the Mess House, 7th Fusiliers, to take the evidence of Commanding Officers.

I. From Poona. No delay. Has been at Rajcote. No loss of efficiency, but some delay when away from an arsenal. Supplies from Bombay, but principally obtained some stores from Ahmedabad.

II. No Camp Equipage in charge. Incident when required by Commissaries of Ordnance, no delay. At Rajcote in regimental charge or under the line Adjutant, who was also the regimental Adjutant. No difficulty as to keeping them in repair. Better looked after in an arsenal, in better buildings. Present store room merely a room at quarter guard, about 40 × 17 × 11 in height. The tents could not be accommodated.

III. No ammunition kept regimentally. Only keeps 20 rounds in pouch. No magazine in lines. Ammunition kept in deposit in the arsenal. Ammunition is drawn as required. Marches out with 40 rounds. The remainder is handed over to relieving regiment. No delay. Thinks the present one a good system. At Rajcote it was in regimental charge. The better plan is to keep it in an arsenal.

IV. Repairs are as far as possible done in regiment by the "moochee" and "lohar." Has a trained armourer and is able to do repairs. Repairs of a serious nature have to be done by the arsenal.

As far as all ordinary repairs are concerned, is independent of an arsenal.

Lieutenant Colonel Hughes, Commanding  
Battery C Brigade, Royal Horse Artillery.

I. From Poona Arsenal, no delay.

Has been on the North-West Frontier at stations far from an arsenal. No difficulty. Was at Kohat, and there was no loss of efficiency to his battery on account of the distance from an arsenal.

II. None in regimental charge. Obtains it from the arsenal. Has experienced no delay. Marching from Nuggur, got it as soon as the carriage was ready. Prefers it being in the charge of the Ordnance Department. Has quite enough to do without looking after it. On the frontier it was absolutely necessary that it should be in regimental charge.

As long as the Camp Equipage is on the spot, it does not matter whether it is in regimental possession or Ordnance Department. No difficulty in either way as to repairs of tents. Tent lascars cannot sew. Has not had to repair tents since he has been in Bombay Presidency.

IV. All repairs can be done except heavy iron work, or fine work as a tangent scale. All materials for repairs can be procured. Battery is complete in itself without de-

pending on an arsenal. Does not consider immediate proximity to an arsenal necessary as long as present contract system lasts; the battery establishment is efficient and can be maintained without the assistance of an arsenal.

Carriages in a very bad condition, all the boxes split. Believes it to be the heat, and from the wood not being properly seasoned. Considers that wood cannot be seasoned in Bombay to stand the climate of the Deccan. Wood seasoned in Poona stands well.\*

\* Believes that the carriages built at Poona of wood seasoned there, would stand any climate.

### *Harness.*

Bombay-made harness, good, has had it 15 months, is not equal to English harness. Some of the reins and stirrup leathers are not quite strong enough.

I. From Poona, great delay in meeting indents. Indented for 3 Guns for "Great Gun Exercise" on the 5th January 1874, and received them 18th February without stores. Stores indented for 18th February, received 4th April.

Colonel Herbert, Commanding 2nd Battalion 7th Fusiliers.

Constant delay for other stores which are not emergent.

Delay perhaps caused by the difficulty of nomenclature. Many names very long, and require shortening, *e. g.*, a soda water bottle; all component parts have to be indented for. In Bengal the system appears simpler.

II. No delay as to Camp Equipage in its receipt.

Prefers Camp Equipage being kept in regimental charge, but the store rooms must be built. The present store room is quite insufficient, and has to appropriate a barrack room.

III. In possession of 20 rounds per man. A reserve in the regimental magazine; the regimental magazine, is  $\frac{1}{2}$  too small for the full amount which is therefore kept in the arsenal in deposit.

No delay. Better to have the whole in regimental charge. At home the regiment keeps a full complement of 200 rounds in regimental magazine. At Aldershot, there are expense magazines.

NOTE—Enquiry might be made as to the practice at home.

IV. Nearly all repairs effected. Has excellent workmen. The regiment is independent of an arsenal. Except that a detachment is dependent for an arsenal. Was commanding a Wing at Poona. All repairs executed regimentally.

V. Build carts, wagons. Has blacksmiths, tinsmiths, painters. Barrack furniture cannot be done at native prices. The workshops could hardly undertake the repair of barrack furniture. Men in workshops are

exempted from all parades except two weekly, but they have to do their guards. Has volunteers in the shops, but the skilled labor is done by tradesmen who enlisted.

Major Hall, Commanding D Battery, 9th Brigade, Royal Artillery.

I. From the Poona Arsenal, no delay. Was at Nusseerabad,; got stores from Neemuch or from Mhow and Bombay. No delay or loss of efficiency in being away from an arsenal.

II. In charge of Ordnance Department, or S. S. O., obtained it through the Brigade Major at Nusseerabad, and could get it in in three days.

Has to make good all deficiencies when returning Camp Equipage.

Commanding Officers would prefer having it under regimental charge as the more efficient system, but could get it as soon as carriage.

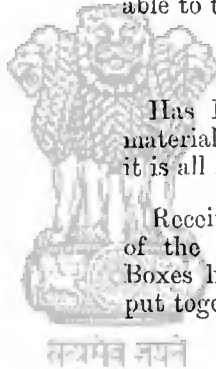
IV. All repairs except welding axle trees. Can do all repairs to keep a battery efficient. A perch twisted at the Camp of Chinchwad and was obliged to send it into an arsenal.

The battery is complete in itself and able to take the field at once.

#### *Harness.*

Has Bombay-made harness of English material. Is good and served well. Thinks it is all English leather.

Received carriages in June 1873. Some of the wheels have had to be repaired. Boxes have stood well. The carriages were put together in Poona.





The Commission met at 11 A. M.

Minute No. 80, dated 8th October 1874

Minutes 78 and 79 were read and confirmed Drafts of Commission were submitted and approved. The Commission discussed the question as to the maps and plans required, and to illustrate their report.

It was decided generally that plans of details of factories and arsenals would not be required, but only of positions of arsenals and forts, &c., That the map previously prepared by the Secretary and a similar one to show arrangements proposed would be sufficient.

The Maps (large sketch Map of India) obtained with detailed information about roads, rivers, &c., &c., need not be compiled in a general map, but would be useful for information. It was decided to ask for sketch maps showing positions.

1. Allahabad.
2. Kirkee and Poona.
3. Kurrachee and Hyderabad.
4. Nagpore and Kamptee.
5. Bombay.
6. Madras and St. Thomas' Mount.

It was decided to ask the Government of India for specification of the manufacture of Henry Martini cartridge and of the powder used.

Also for cost of the Storehouse containing Camp Equipage, and Gun-sheds, Grand Arsenal, Bombay.

The Commission proceeded to discuss printed papers.

*Gunpowder.*—Decided to ask for Statements from Bengal and Bombay of the annual requirements of the Army in gunpowder. Colonel Haggard's form of account to be sent to Ishapore and Madras to be filled up.

Agreed to thank Colonel Haggard for the papers regarding H. Martini powder, and to ask him what quantity he can make monthly according to the specification furnished.

*Gun Carriage Factory.*—Papers were gone through, and decided that no further information is required.

*Camp Equipage.*—Papers gone through and decided that no further information is required.

Adjourned at 4-30 P. M.

*Minute No. 51, dated 10th October 1874.*

The Commission met at 11 A. M., Colonel Worgan, R. A., Inspector General of Ordnance, Bombay, attended the meeting.

On the question of deterioration of stores in the climate of Bombay. Colonel Worgan stated that harness and saddlery, and leather equipments, cordage, steel, &c., were much affected by the climate. The damp situation of the arsenal at Aden also deteriorated stores. The Poona climate has been determined experimentally to be better than Bombay, 500 dragoon saddles were kept in store in common boxes for 3 years and were as good as new when opened. Does not think that lubrication would have a good effect in the Bombay climate. It turns the harness black. In Bombay also fine tools as armourers files, &c., are completely spoiled by rust.

On the question of the amount of store accommodation in the Grand Arsenal Bombay. Colonel Worgan pointed out that the stores had increased very largely, and that it contained now, both old and new equipments. Artillery also was in a transition state, and required extra room for new equipments. More Camp Equipage is however now kept at Poona.

If the sites of the present Warrant Officers quarters were utilized for storage room, there would be difficulty in providing for them elsewhere.

In Poona rifles keep perfectly well, but in Bombay they deteriorate. There would be a difficulty and delay in issuing the Siege Train in the Grand Arsenal, as the gun would all have to be mounted on the carriages.

A part from the Military question and only looking at it from the point of view of the Ordnance Department, Bombay is the most convenient point for the receipt and issue of stores, and leaving out of consideration the climatic effect. A railway has been planned from Patus to Munmar so as to connect the 2 branches of the Great Indian Peninsula Railway; this would place Poona in direct communication with the main Great Indian Peninsula Railway. On the whole considers Poona the best place for a large arsenal.

In regard to the question as to the reduction of arsenals, considers that Neemuch might be reduced to a small dépôt were communications to be improved. In his opinion one arsenal would suffice for Scinde.

Belgaum is isolated and difficult of access. But if the road were bridged and improved Belgaum might be reduced to a dépôt. The transactions are very few.

Noted to consider the question of the supply of Belgaum from Bellary.

*Ahmenadabad Depôt.*—The rule obtaining in the Ordnance depôt is that Ahmenadabad should be supplied yearly with all stores required for the troops dependent.

*Ahmednuggur.*—The depôt is now reduced to merely 1 conductor and some lascars to look after stores not valuable enough to be removed. Adverting to the large number of Indents received by the Bombay Ordnance Depôt for the Army, Colonel Worgan stated that there were many classed as 'emergent' and that the rules in force were not upheld.

The Commission adjourned at 2 p. m.



*Minute No. 82, dated 13th October 1874.*

\* File Secunderabad Arsenal.

The Commission met at the Arsenal Secunderabad at 1 P. M. The arsenal is in course of removal to Trimulgherry. Both establishments are in charge of Major Smith, R. A., with the assistance of the Deputy Assistant Commissary at Trimulgherry. Copy of the Morning Report was handed in marked A.\* The office books were inspected; a list of them handed in marked B and attached. The Journal. Each branch or godown has its own journal. Transactions are posted daily in them, and in the office journal, and these are compared fortnightly. The documents sent to the Examiner are :—

- I. Monthly list of issues, receipts and remains. This takes 2 clerks 10 days to prepare and 10 to check.
- II. Material and labour report.
- III. Annual list of issues, receipts and remains. This takes 3 men 20 days to prepare.

The question of the necessity for the Examiner receiving monthly list of remains, &c., was discussed, and it was noted that this point should be particularly enquired into in Madras.

The *Ledger* goes on from month to month and is not closed yearly; as No. III is furnished annually. The Commissary of Ordnance brought to the notice of the Commission, the great difficulties as to communications by road, especially to Goolburga. The Commission visited the gun-shed, carpenters' shop, workyard, harness godown, Camp Equipage stores and tent godowns and magazines. The Commission noticed that the Warrant Officer and Serjeants have each separate charges. The stores are mainly at Trimulgherry, the workshops being retained at Secunderabad for want of space at Trimulgherry.

Adjourned 5 P. M.

The Commission met at the Trimulgherry Arsenal, in the entrenchment, at 1 P. M.

*Minute No. 83, dated 12th October 1874.*

They examined the books and discussed the duties of the Gate Conductor. It appears that when stores are received into the arsenal, they are taken by the Gate Conductor to the general store godowns, the stores are unpacked, and entered in the gate book, in the journals of the stores. Warrant or Non-Commissioned Officer in charge, and in the office journal, a list being also made out as a receipt by the receiving store, Warrant or Non-Commissioned Officer to the Gate Conductor who sends it to the office, where it is copied and filed. This process appeared to the Commission to be somewhat complicated and to require investigation at the Grand Arsenal, Madras.

The Commission also decided to note the procedure in regard to indents from regiments, *e. g.*, a lance broken on parade is required to be replaced. A Regimental Committee is held—indent made out by Quarter Master—signed by Commissary of Ordnance—and Officer Commanding the Station, it then passes through Assistant Adjutant General to Adjutant General, who sends it to Inspector General of Ordnance for opinion, who returns it to the Adjutant General. The latter returns it to the Inspector General of Ordnance.

The Commissary of Ordnance has to see that the corps pays for the stores in the former case, and sees that the money is received.

The Commission visited the General Stores, Armoury, capable of containing 4,500 stands, (Memo. of arms handed in marked C) gun-sheds, forge, iron godown, armourer's shop. In the latter about 8 men were employed, sepoys armourers were being instructed. Unserviceable stores, Snider ammunition room, Ordnance godown, and Quartermaster's stores, magazine and laboratory, constitute the arsenal.

The Commission note that the entrenchment is commanded by 3 hills; that the profile of the work affords little protection to the buildings, which from the lay of the ground are not defiladed: and that one side is open with only a ditch and no parapet.

Adjourned at 4 P. M.

*Minute No. 84, dated 14th October 1874.*

The Commission met at 12½ P.M. at the Royal Artillery Mess, Trimulgherry, Secunderabad, to take the evidence of Commanding Officers.

Colonel Falls, R. A., Commanding R. A., H. S. F.

I. All stores from arsenal at Secunderabad. No delay in getting stores, but great delay in getting indents passed. Long channel of correspondence for even stores sanctioned by G. O.

Indented in August for practice ammunition and has not got it yet. Does not consider it necessary for it to go to the Inspector General of Ordnance.

Note by Colonel Stewart. The reply is incorrect, the course laid down is shown in O. C. to I. G. O., Madras, No. 13 of 1866.

G. O. Commanding Divisions, object to sign indents. The course is from Battery to the Officer Commanding Royal Artillery to the Assistant Adjutant General, for General's signature, checked by Commissary of Ordnance, sent by Inspector General of Ordnance to Madras. Considers that stores sanctioned by Government in G. O. should be given on the demand of the Officer Commanding Royal Artillery.

Was stationed at Jaulna, and does not remember being kept waiting for stores. Considers that for a large force an ordnance establishment is necessary, but unnecessary at small stations, more especially now the Railway Company is becoming extended.

II. Camp Equipage obtained on indent when required. No delay. Repaired on the march by tent lascars. Officer Commanding Battery responsible for Camp Equipage and for returning it in as serviceable state as that in which he received it. Is not aware of any difficulty or disadvantage in the existing system. In the present buildings has no accommodation. Considers also that the N. C. O. and Sergeants have quite enough work at present.

IV. Batteries all complete and able to effect all repairs except heavy work, as welding an axletree. Materials can be procured from the arsenal. English leather and storage for the arsenal too. Used to obtain leather for H. A. tannery at Bangalore and even at Secunderabad. All harness is now English. The old country-made harness answered perfectly well though it did not last so long, but it cost much less. The English harness is very good.

Believes that the arsenal is only placed where it is because the entrenchment was previously built.

Has heard that it will not be possible for the Trimulgherry Arsenal to contain all the stores required for the H. S. F. Considers

that the position of the entrenchment is faulty as it is effectually commanded on 3 sides at 1,500 yards, and part of it is a mere ditch. It has been recommended that towers should be placed on the hills commanding the place.

I. From the arsenal at Secunderabad, Delay in indents being sent to head-quarters, does not affect efficiency in ordinary garrison work but might do so in an urgent case. Could be got on an emergent indent. Was at Thyetmyo, and got stores from a depôt, Meaday, where there was a detachment. The river was between and it would have been better had the depôt been at Thyetmyo.

Colonel Phillips, 29th M. N. I.

II. Camp Equipage in Ordnance Department. Same delay in getting indents passed. The indents both in original and duplicate sent to Army Head Quarters by the Divisional Quarter Master General who checks them. Acted as Assistant Quarter Master General of the Division. The regulation must be often broken through. There is no check by the Commissary of Ordnance. Camp Equipage returned into an arsenal, examined, and reported on.

In Burmah had Camp Equipage in regimental charge from 1857-60. As far as the efficiency of the service is concerned, prefers Camp Equipage being with regiment, but then a larger stock is required. Believes that only 2-3rds are kept up for native troops here. Would require a regimental store room.

III. 200 rounds per man, and 90 practice ammunition in regimental charge.

A regiment should have its practice ammunition. The reserve ammunition might be in a station or garrison magazine.

Colonel Phillips also brought to notice a form indent made out by him.  
Ordered to be recorded for further information.

IV. All repairs can be made in the regiment to the present arm. Supposes that the 2 sepoy armourers and 1 private man (trained in arsenal) could if instructed do work with Snider arms. Can do all the browning. Apparatus is now being put up.

If ammunition and Camp Equipage were kept at the stations, considers that there would be no absolute necessity for an arsenal at the station.

II. Camp Equipage kept in arsenals and issued on indents countersigned by officers of Q. M. G.'s department and sanctioned by Q. M. G. of the army, but *issued* by Asst. Q. M. G. Q. M. General settles the requirements.

Colonel Dawson, Asst. Q. M. G., II. S. F.

Camp Equipage at Secunderabad is for the full equipment of the moveable column

and some extra. Does not know on what principle it is maintained. It is calculated by the Q. M. G. Makes no indents. Tents are sent up without reference.

Sends a monthly return. Commanding Officers are responsible for Camp Equipage when it is in regimental charge. When repairs are wanted they are effected on contingent bills, or when at an arsenal by the Ordnance Officer. Any damage by neglect is charged to the regiment. Deficiencies have to be made good by the regiment.

Camp Equipage should be in regimental possession in this force. Carriage could be given in an hour.

Last year equipped the whole force lightly and marched in 4 hours' notice. Has permanently hired cattle kept by a Rajah, costing 4,000 Rs. a month in Commissariat charge, and some 300 or 400 are always kept in the station.

Barrack furniture is supplied and repaired by the Commissariat Department. The Barrack Master is under Asst. Q. M. G., only soldiers' boxes are supplied by Ordnance Department, *i. e.*, made and repaired.

The Barrack Master has no stores—no reserve.

Colonel Wilkinson, Commanding 16th Lancers.

I. From Secunderabad. Delay not infrequent where demands have to be referred to Madras. There would have been a loss of efficiency had the whole equipment been required for service. Indents go in daily. For the ordinary efficiency of the regiment there would be no disadvantage if there were no arsenal at Secunderabad; if great losses were incurred there might be a difficulty in supply. Instances the system of the supply of necessaries. Thinks there need not be an arsenal if the regiment be equipped with extra stores. But with the present allotment is quite dependent on an arsenal.

With reference to the question of spare saddles being available when the regiment marched into Secunderabad, only two men were sick and did not ride their horses, so that only 2 saddles were spare.

II. Has no Camp Equipage procured on indent, and experienced no delay. Has to return it in as good condition as he got it. Prefers the system of each regiment keeping its own Camp Equipage but has no practical experience of the system.

On an occasion when the whole regiment moved with families, there was difficulty in getting the whole of the Camp Equipage. Believes that the more efficient system is the regimental one. Store accommodation would have to be provided.

\* Enquire in Bengal, whether tents are allotted for families.



III. Is only armed with pistol—is in possession of full proportion.

IV. In almost all cases, Saddlery wears 8 years. Gets certain portions of saddlery yearly. Saddler's Shop—Saddler and Assistants, draw materials as wanted day by day. The only way on service would be to take a reasonable quantity of material. Does not know of any scale for materials for repair of saddlery. There is a scale of materials for arms.

I. From Secunderabad Arsenal. Some delay owing to the length of channel for indents.

Major Macleod, Commanding F-20.

Was at Thayetmyo three years, where there is a small depôt.

Stores from Rangoon. At one time had to wait for leather and stores from the Magazine at Rangoon. The system in Madras is for batteries to look to arsenals for leather, serge, &c.

Harness in use 5 years, 11 months.

Returned harness at Thayetmyo, and Battery received new equipment.

Had lasted 6 years, but was still very good. Returned it without having a Committee on it.

II. Camp Equipage in the arsenal received in serviceable condition, and has to be returned in an equally serviceable condition. Has seen occasions when there is not a sufficiency of Camp Equipage at out-stations, such as Thayetmyo, when Camp Equipage is wanted for sickness. If every regiment and battery has its own Camp Equipage, much trouble would be saved. Would require additional storage. It might be all in one building at Trimulgherry.

IV. All repairs can be effected; rivetting, has been rivetting on footrests. Carriages of F-20 at Thayetmyo originally came from Sangor. Madras woodwork is as a rule good. In Burmah peddowk stood better than Moulmein teak.

Half-wroughts from the arsenal, leather, serge, hemp, soap, &c. keeps a small quantity to keep the battery going for 2 months or so.

If on service, would have to be independent of an arsenal. The battery might be independent if it had enough material.

I. From the arsenal at Secunderabad. Does not remember any delay affecting efficiency in regiment. Has been stationed at Hazareebagh. Cannot give any opinion.

Colonel Lockhart, Commanding 107th Regiment.

Once in cholera camp had to get Camp Equipage partly from Fort William, partly from Allahabad.

II. Camp Equipage in Ordnance Department prefers regimental system of keeping Camp Equipage. Has had no practical experience of the other system. No store room.

III. 200 rounds per man and 90 practice in regimental charge. Prefers regimental system.

IV. Thinks all repairs can be effected regimentally.

V. Has workshops. Oblige the men in the workshops to keep hours. Capable of repairing barrack furniture and of making it. Does all repairs. Men are paid by the day, 10.

Indents on arsenal for soldiers' boxes, thinks that the regiment makes them up sometimes.

Major Elton, Commanding Heavy Field Battery,  
No. 5 Battery, 5th Brigade.

I. All from arsenal. Indents half-yearly. Occasionally a little delay owing to the long channel of communication. Has never been at a station where there was no arsenal.

II. No Camp Equipage in charge. The only times has indented for Camp Equipage emergently for practice. When Camp Equipage has been returned has had merely to make up such deficiencies.

IV. All repairs can be effected by native artificers; draws half-wrought yearly, these are accounted for. Chiefly the indents are for ammunition, 5 or 6 per month; blank ammunition for station guns, &c., without ammunition, 1 or 2 monthly; when stores cannot be re-placed they must be indented for. Except as to half-yearly materials is independent on arsenal. Is not aware that the climate of the Deccan affects the carriages made in Madras; a few repairs have had to be effected. In three years only two heavy wheels required repair.

Adjourned at 5 P. M.

The Commission met at the Residency Hyderabad, at 1 P. M. Minutes 80-84 were read and confirmed.

*Minute No. 85, dated 16th October 1874.*

Col. Hastings Fraser, Mily. Secy. to the Resident at Hyderabad, attended the meeting for the purpose of affording information in regard to the Ordnance Depôts for the Hyderabad Contingent. These are:

Aurungabad which supplies Jaulna.

Ellichpore.

Hingolee which supplies Mominabad.

They are under officers commanding batteries who do not however draw any allowance.\*

\* They are assisted by warrant officers.

Lingasoogoor and Bolarum are supplied from Secunderabad.

All stores are drawn from these depôts from Secunderabad yearly.

The Berar police also get stores from the depôts.

The regiments of the Hyderabad Contingent keep their regimental ammunition which is on the scale allowed to the army.

Regiments have all stores except tents in regimental possession.

The corps of the Hyderabad Contingent are equipped in every respect as troops of the line, the tents being kept in depôts and at out-stations with the regiments. The cavalry receive nothing but ammunition from the depôts. All the regiments and batteries draw contract allowance for the repair of arms. If it be considered in an imperial point of view objectionable to have numerous depôts, and if it be found that the army at large can be kept in an efficient state, there seems no reason why the contingent should not be placed on a similar footing.

On the question of supply of stores from the Hyderabad Contingent if the arsenal at Secunderabad were reduced, considers that the Hyderabad Contingent could be supplied from the same source which the Hyderabad Subsidiary Force received its stores from, i. e., from Madras or Bombay.

Considers that the Hyderabad Contingent should not be charged so high a percentage for ordnance stores as 35 per cent. It is not equitable as it unduly reduces the balance which may be due to the Nizam from the Berars. There is no complaint as

to the difficulty of the source of supply ; but only of the expense of repairing and making equipments under the present system, and which could be done by a small establishment at Bolarum.

The contingent also lose on stores which are returned to the Madras Ordnance Department, and which have originally been charged for at 35 per cent.

Colonel Fraser handed in the Half-yearly Returns of stores in the three depôts.

From these it appeared that the principal stores are accoutrements, arms, armorer's tools, Camp Equipage, dhoolies, musical instruments, tools of all kinds, materials for repairs, half-wroughts, ammunition, shot and shell, gun and ordnance stores, &c., &c.

\* Beder.  
Golconda.  
Deva Kanda,  
Kowlum.

It was decided to ask the Political Department for information about the Forts in the Nizam's dominions.\*

Also to ask General Blake for his opinion as to whether an arsenal should be maintained at Secunderabad, now the means of communication are improved.

The re-organization of the Hyderabad Contingent and Ordnance Department was effected by G. O. 215 of 14th December 1853 and was fixed at ;

1 Comy. of Ordnance.  
Genl. Depôt—1 Depy. Asst. Commissary.  
1 Conductor.  
1 Store Serjeant.  
3 Syrangs and Tindal.  
15 Lascars.  
Aurungabad. } 1 Serjeant.  
Ellichpore. } 2 Tindals.  
Hingolee. } 12 Lascars.

The Commission adjourned at 5 P M.

The Commission met at 7 A. M. at the Ordnance Depôt in the Lower Fort, Bellary. The Ordnance Depôt is in charge of Ensign Francke.

*Minute No. 86, dated 19th November 1874.*

The Commission visited the workshops, carpenters, smiths and armorers, which are under charge of a foreman of the Carnatic Ordnance artificers. There are two other C. O. A., 7 native artificers. Soldiers' boxes are supplied by the Ordnance Department, and sent from Madras to Bellary.

The Commission visited :

The General Store Godown.

Armoury, and Ordnance Godowns.

Gunsheds.

Laboratory.\*

Quarter Master's Store Rooms.

Camp Equipage† and

Powder Magazine.

\* Service cartridges filled for Artillery. E. R. ammunition made for Native Infantry.

† Note.—There is not enough for the whole force.

They visited the office and inspected the books kept up.

The journals are compared weekly and the ledger monthly.

There is a gate Conductor on duty continually who has charge of the office journal, but the actual gate duties are taken by the week.

There are 3 clerks in the office.

The Commission noted that there was much space for the enlargement of this depôt if necessary.

The morning report, statement of Camp Equipage, list of books, distribution and employment of workmen ; handed in marked A, B, C, D and attached.

Minute 85 read and confirmed.

Form of return regarding gun carriages laid before the Commission by Colonel Hatch, and it was decided to circulate the former for consideration.

The Commission adjourned at 9 A. M.



*Mimute No. 87, dated 20th October 1874.*

Col. Buchanan, Commanding 4th Light Cavalry.

The Commission met at Bellary at 7 A. M. to take the evidence of Commanding Officers.

I. Indent has to go through a great deal of checking and countersignature, otherwise no delay.

Camp Equipage with Ordnance Department. No delay. Has had no difficulty. On service repaired the tents as best they could. There is no Committee held on the return of tents unless there are objections. Present system works smoothly as a rule. Last year tents had to be got from a hospital which had been blown down; and could not get tents; though the General authorized them. They could only be got after 3 weeks' delay, when the necessity had passed away. Should be inclined to let the system rest as it is. Does not think that any real additional work would be entailed on the Quarter Master, by a change.

III. Ammunition kept in regimental charge. Prefers it to be in regimental possession rather than in a more central position, as an arsenal.

120 rounds.

IV. All repairs can be effected regimentally except heavy work. Has a man now under training in Madras.

#### *Saddlery.*

Makes up and repairs all Saddlery regimentally. Under the Saddle Contract at Rs. 2-13-0 per saddle. Balance accruing equally divided among four Commanding Officers. In the first instance the saddlery is given by Government. System has lasted 80 years. Saddle last 12 or 14 years. Saddle trees are obtained on payment from arsenals.

Colonel Carter, Commanding 21st M. N. I.

I. No delay.

Quarters at Jubbulpore and got stores from Allahabad.

II. No Camp Equipage in regimental possession. At Jubbulpore had it in regimental possession. Prefers it in regimental charge if there is a place to keep it in. Only cost Government Rs. 28 for five years (and had the greatest difficulty in getting that).

The Camp Equipage was taken away for a Rest Camp for a Madras regiment at Jubbulpore. This was occasioned by application having been made to the Madras Quarter Master General. Has more room in the Barracks, Bellary, than at Jubbulpore.

III. Has no room in Regimental Magazine, has only 1 Magazine, and keeps 126,000 rounds in the arsenal in deposit. The system is to keep it in regimental possession.

Prefers it to be in Regimental charge, at Jubbulpore had it all.

IV. All repairs can be effected. Has trained armourers, sepoy; believes they can brown arms.

I. From depôt here, no delay. Was at Wuzeerabad and Sealkote, and remembers no difficulty in getting supplies. Provided the regiment has its own equipments, a regiment might be supplied from Madras. Would look ahead for supplies.

Colonel Travers, Commanding 48th Foot.

II. Camp Equipage in regimental charge. Has had experience of Bengal system and prefers the tents being in regimental charge. A Regiment is able to go at once in the field at half an hour's notice. Is decidedly of opinion that the regimental system is the best.

III. Has service and practice ammunition in regimental charge. Prefers the ammunition to be in a central station magazine, if all the troops are armed with sniders. Speaking regimentally it would be well to have it in regimental charge. But it would be better to have a central station magazine under regimental charge. The "camel boxes" lately received, weigh, full, 280 lbs. supposed to contain 2,400 rounds.

420 lbs. 1st box received.  
750 lbs. 2d     "  
Covered with gunny.

IV. All repairs can be effected regimentally. Able to take the field at once if carriage be provided.

Printing Press. Carpenters cannot compete with natives as to price of wood in bazar. Does all repairs in the barracks. Teak in bazar costs 4-8 per cubic foot, and cannot get wood from Executive Engineer, it is too dear. Cannot keep a store of wood.

The difficulty in making the furniture in a regiment is not the expensive nature of the labour, but the material.

Instances Malta, where his regiment did everything for the Brigade. The Controller supplied material at cost price. In England the greatest encouragement is given to regimental work. The men in workshops are excused from all parades except 1 Commanding Officer's parade. They are usually men. Has a Tinsmith's shop and many others.

I. No difficulty.

Colonel Gloag, Commanding Royal Artillery.

At the frontier station in Burmah there was delay but no loss of efficiency.

II. Camp Equipage always in store. Never any difficulty in getting out Camp Equipage. The Battery should have its own Camp Equipage with a proper establishment.

IV. All repairs can be effected in a Battery, if there is a larger establishment. In the Battery here, had to send to Madras in consequence of the Battery artificers not being able to do it. Difficult to retain native artificers. If the wheeler and collar makers are ill, it is difficult to get the work done. There are 5 European artificers and 10 native artificers.

Major Lane, Commanding B-20th, R. A

English harness. Has never had any difficulty with it.

The Batteries carry material for repairs in the field. The store limber wagon carries it.

I. In many cases the stores are not in the depôt, and delay ensues as they have to be obtained from Madras. Keeps half year's supply of leather and material, and obtains other stores as required. If stationed where there is no arsenal, would keep 6 months supply.

II. Camp Equipage in Ordnance depôt. No delay or difficulty in getting it. Nor on an emergency.

IV. All repairs can be done except browning arms.

V. All repairs. Not necessary for the efficiency of a battery to make constant incidents. Establishments quite sufficient. Believes that less work will be required with iron than with wood carriages. Had a good deal of knocking about at the Camp of Exercise.

Has nothing but battery workshops. Could effect repairs to barrack furniture. But when it was tried there were disputes with the Barrack Department.

Has English harness, it is very good. Has had it 7 years, and it might last 7 more. No difficulty in retaining artificers. The establishment of artificers is sufficient even if that were no Ordnance Department on the spot to fall back on.

The Commission adjourned at 8-30 A. M.



The Commission met at 11 A. M. at the Magazine, Bangalore, under charge of Major Ouchterlony, R. A.

*Minute No. 88, dated 23rd October 1874.*

They visited the Camp Equipage Branch Depôt or lower arsenal; the harness and saddlery. In the Camp Equipage branch 79 lascars are employed. Enough Camp Equipage is kept up for the whole garrison: 48 native tents being in excess and 13 S. S. tents deficient. The lower arsenal store-rooms were inspected; accoutrements, entrenching tools, gymnasium apparatus, &c.

The Commission visited the magazine, laboratory, the gate office, or receiving and issuing branch. The Morning Report was handed in marked A and attached. Distribution of establishment and their employment, marked B. List of books kept up marked C. The books kept up were inspected.

There are 4 clerks in the office. The Commissary stated that at the time of the Camp of Exercise, the tents were returned irregularly by corps. Merely thrown down without any invoice. Two tents were lost.

The Commission inspected the General stores, armoury, ordnance stores, workshops, carpenters' and smiths' shops, &c.

After their inspection of the Magazine, the Commission proceeded to discuss the papers received with Military Department, No. 381, dated 7th October 1874, regarding the terms of renewal of service of Messrs. Peaker and Poke, Engineers of the S. A. Factory, Kirkee. The general principles upon which the report was to be drawn up were agreed upon and Mr. Haliburton requested to draw it up in accordance therewith.

The Commission adjourned at 3 P. M.

*Minute No. 89, dated 24th October 1874.*

The Commission met at 11 A. M. at the Office of the A. A. G., Bangalore, to take the evidence of Commanding Officers.

Colonel Bruce, Commanding R. A.

I. From Bangalore. No delay. Has been over and over again distant from an arsenal. No loss of efficiency to Battery. In Bengal stores are supplied periodically, half-yearly. An ordinary breakage or deficiency would stand over to the Half-yearly Committee. At Bangalore indents are continually coming in every day, and have to go to the G. O.

II. Camp Equipage obtained on indent, sanctioned by the Quartermaster General. Considers that the best system is to keep it with batteries. Has had little experience of the Madras system except the Camp of Exercise; but has experienced no difficulties. Would probably be able to get the Camp Equipage as soon as the carriage could be obtained, if the arsenal were close.

IV. All repairs can be effected except forging an axle. A stock is kept up of materials for repairs. Officers Commanding can indent on arsenals on payment. A battery is independent and prepared to take the field.

The harness is English. In some of the harness received from England, the work was scamped, the breechings especially. The harness of 2 out of the 3 batteries has all served its time.

Major Peile, Commanding C-9th, R. A.

I. From Arsenal, Bangalore. Delay caused by the length of the channel, owing to the number of signatures required. Indents, frequently, and for any little stores required.

II. In Ordnance Department. Only time has had Camp Equipage; once on the march and once for the Camp of Exercise. No delay in these instances. Preferable to have the Camp Equipage in regimental charge, if there be store-room.

IV. All repairs can be effected, but does not consider the number of artificers sufficient. In case of sickness there is no margin of European establishment. In England has more. The native establishment is not so efficient as the European establishment. If the native establishment happens to be good, a battery may get on, but it is only when properly superintended.

The battery is independent. Was over 3 months on the march from Kamptee here. Keeps up about 6 months' supply of stores. Harness is English, has lasted over 6 years.

Universal saddlery has to last 8 years; but in his opinion certain perishable articles as wallets, ought not to have to last so long. The carriages are good.

I. Delay caused by the number of persons through whom the indent has to pass. The delay is unnecessary. Was at Khyragully. No loss of efficiency in being distant from an arsenal.

Major Barnes, Commanding C C., R. H. A.

II. Better to have the tents with the battery in every way. Has had no experience of the system in the Madras Presidency. At the Camp of Exercise, the tents were pitched by the Ordnance lascars.

IV. Has not had a farrier capable of doing carriage smith's work. Native establishment very bad. Cannot get men to take the Carpenter's place.

In Bengal there was no difficulty.

Can do repairs, but not well; thinks that there should be a larger European establishment.

On the whole the carriages are good; but a few of the sides of ammunition boxes have gone, apparently from want of seasoning. The climate is equable here.

Has English harness. Been in store since 1862; some of the leather-work was made by contract. Some backbands were found made of old cruppers. Has been condemned.

I. From the arsenal, no delay—all materials from the arsenal.

Colonel Prettyjohn, Commanding 18th Hussars.

Annual estimates. Gets what is wanted whenever required.

Has been at Umballa, Meerut, &c. Always managed to get on very well. Was with the 14th Light Dragoons.

II. Considers the Bengal system the most efficient. But can get camp equipage readily in the Madras Presidency.

III. Has the service complement of ammunition in the regimental magazine.

IV. Has no workshops beyond the armourers; S. T. makers, &c. Has 3 or 4 months' store of material.

English-made saddlery has lasted over the time.

Was at Kirkee in 1838 with the 14th Light Dragoons. The Bombay harness, country-made, stood very well. The regiment is independent of an arsenal, except for camp equipage.

I. From Bangalore. No delay. Has not been at a station away from an arsenal. Was at Thyetmyo; and no loss of efficiency in being away from an arsenal.

Colonel G. A. Fulton, Commanding 36th M. N. I.

II. Camp equipage in the arsenal. Indents on the Quartermaster General. The system is quite efficient, and the camp equipage is less liable to damage than when in regimental charge. Prefers the present system.

III. Has no regimental magazine, and the service ammunition of 200 rounds is kept in the arsenal in deposit. Thinks that it is better to keep it in an arsenal.

IV. All repairs can be effected. Has trained armourers, sepoy, and they can brown arms and effect all repairs.

Is independent of an arsenal if the regiment be in possession of camp equipage and ammunition.

Does not indent frequently. But if a damage or deficiency takes place, an indent is at once sent in.

Colonel Thorp, Commanding 89th Foot.

I. From the arsenal. No delay. Has not been at any station away from an arsenal. At Cannanore there was a Depôt, from which he got everything except camp equipage.

Was at Deesa, and has been in Bengal.

Has been at Gwalior, Jhansi, Agra, Umballa, Mooltan. Has never heard of any loss of efficiency in being away from an arsenal.

II. There is much to be said in favor of both systems. At some stations in the Madras Presidency as Cannanore, when there is an excessive rainfall; there would be great difficulty in keeping it in good order. No inconvenience in the Bombay Presidency system.

III. 200 rounds in regimental magazine, of which 20 in pouch. Does not know what the reserves are. Prefers having the 200 rounds in regimental charge.

IV. All repairs can be effected by regimental establishments. Has sufficient stock of component parts. Draws supplies as they are wanted, frequently.

Is able to move out with supplies and independent of an arsenal.

V. Has workshops. Quite capable of making and repairing barrack furniture. Has never been asked to do it. Has brought it to notice. Wishes to do the barrack work. The men employed are relieved from ordinary duty, such as guards. The great fault is lack of work.

VI. Full complement of camp equipage for the whole force of European and Sappers, 2/3 for Native regiments. The tents are made up in the Commissariat Department, lined from Camp Equipage depôt at Madras. Tent lascars are maintained at 4 per cent. for Europeans, 2 per cent. for Natives.

Major Mesham, Assistant Quartermaster-General, Mysore Division.

Regimental lascars are employed under the Quartermaster, and on the march are employed with camp equipage. They act as pioneers too.

It has been proposed to remove the Ordnance Magazine from the present position in the Fort. Major Mesham explained the various positions proposed for a new entrenchment.

Camp equipage. When this is returned, the Ordnance Department say if the regiment is to be charged. Knows of no case in which a regiment has been charged. Regiments take care of their camp equipage as a rule. Not much use for camp equipage in the Division.

#### *Barrack Department.*

All regimental indents countersigned by Assistant Quartermaster-General. Barrack Department indents on Commissariat Department. Colonel Osborn, Barrack Master, supply made by Commissariat to the Barrack Department. Barrack Master effects petty repairs to fixtures up to Rupees 50, but the Commissariat repairs all furniture, looks after barrack damage.

The present system has lasted for 9 years. The plan of regiments doing the barrack furniture repairs, has often been tried and has failed. The present system has proved satisfactory. Sometimes delay takes place in making supplies of new articles. The Commissariat keeps a small establishment for repairs.

I. From Bangalore. System of indents is very faulty. Has to go through so many hands. No delay in getting the stores. Never away from an arsenal.

Major Wynch, Commanding D-20, R. A.

II. Camp equipage in arsenal. Has had no experience of system. Thinks it would be an improvement for a battery to keep its own camp equipage.

IV. All repairs can be effected. Is in possession of all requisite material for repair. Indents just as stores are required. Has a supply of contract stores. Could go on service independently of an arsenal.

V. Artificers are good and sufficient.

Has the old carriages (S. B.) serviceable.

Has English harness. It is serviceable.

The Commission adjourned at 2 P.M.

*Minute No 90, dated 26th October 1874.*

The Commission met at 11 A.M. at Bangalore.

Report on Messrs. Peaker and Poke referred to in Minute 88, drawn up by Mr. Haliburton, read and agreed on.

Printed papers on harness and saddlery, drawn up by the Secretary were read, and also "general" printed papers. It was decided that no further information was required beyond ascertaining from each Presidency, the exact length of time harness and saddlery are expected to last.

Madras P. W. D. of 819, of 22nd October 1874, subject Barrack furniture. was read and reply approved.

The Commission inspected the proposed site at Shevenpilly for the entrenchment to contain the Ordnance Magazine, &c., in the morning.

Adjourned at 1-30 P.M.



The Commission met at the Ordnance Depôt, Trichinopoly, on the 5th November; and recorded that they had taken advantage of the 7 days' leave granted them by the Government of India, Military Department, from the 27th October to the 3rd November. They visited Ootacamund and rejoined at Erode Junction on the 3rd November.

*Minute No. 91, dated 5th November 187.*

The Commission assembled at 7 A.M. and proceeded to inspect the Depôt in charge of Acting Depy. Assistant Commissary Burke, the Deputy Assistant Commissary in permanent charge, being on leave.

A "Present State" was handed in marked A, and attached. Copy of the Morning Report marked B, and attached. List of books kept up marked C, and attached.

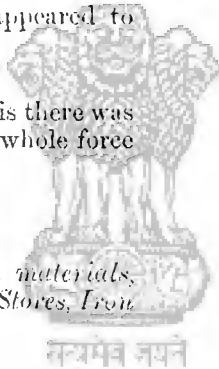
Distribution statement showing the manner in which the artificers, &c. are employed, marked D, and attached.

The Commission visited the *armory*, capable of holding 2,000 stand of arms. In the *Quartermaster's stores*, there appeared to be very few demands.

*Camp Equipage Store.* In this there was enough Camp equipage for the whole force at Trichinopoly.

*The Unserviceable Store.*

*Gun-sheds, cartshed, H. W. materials, Harness and Saddlery, General Stores, Iron Godown.*



The Commission visited the Gate Conductor's office and inspected his book. All accounts are entered therein of receipts or issues, the Godown Conductors being responsible for accuracy.

The Commission visited the office and inspected the books. The average annual

number of indents is 207.	{	Ordnance ...	172
		B. F. ....	25
		C. E. ....	10

The Gate Book, Ledger, Work Reports, were inspected.

Also the "Monthly Report of Materials." It was noted that enquiry should be made in Madras in regard to the number of Offices through which the Report passes, and whether the Commissary of Ordnance, Fort St. George, now has anything to do with the check of these Reports. The "Monthly Report on Stores received from Corps and departments" was inspected. Noted to enquire as to whether it is necessary for this to go to the Examiner.

"List of Issues, Receipts and Remains" was inspected.

Each arsenal prepares a ledger yearly, and sends it to the Examiner with titles entered and rated.

The Commission visited the Magazine outside the depôt. It will contain 2,000 barrels of 100 lbs. each.

The Commission adjourned until 12-30 P. M., when they re-assembled.

Minutes 88, 89, 90 were read and confirmed.

The Secretary was requested to apply to the Quarter Master General, Madras, for a copy of the Committee Proceedings on the new site for an Entrenched Camp at Bangalore.

Also to apply for a Report on the climate at Cannanore in regard to the statement that tents cannot be kept at that station.

The Commission adjourned at 2 P.M.





The Commission met at 11 A.M. at the Inspector General of Ordnance's Office, Madras.

*Minute No 92, dated 10th November 1874*

The Commission discussed the work to be done in and near Madras, and decided to take the establishments, &c., in the following order, subsequently altered as marginally noted.

Grand Arsenal, Tuesday, 10th November.  
Do. do. Wednesday, 11th do.  
and Fort Magazines.

Ordnance Examiner's Office, Thursday, 12th.

Gun Powder Factory, Friday, 13th.

Office work at Fort, Saturday, 14th.

Laboratory, Field Train and Reserve Powder Magazine at the Mount and Commanding Officers } Monday, 16th.

Commanding Officers at the Mount and sites for Ordnance Establishments. } Tuesday, 17th.

Quartermaster General at 11, Fort-  
Commissary General at 11½.  
Commanding Officer's at 12.

Commanding Officers and Quarter Master General, Fort, and Commissary General, Madras, } Wednesday, 18th.

Gun Carriage Factory, Thursday, 19th.

Gun Powder Factory.

Gun Powder Factory, Friday, 20th.  
21st.

Gun Carriage Factory and Mount sites in evening.  
Gun Carriage Factory.

Avady.....23rd.

Avady.

It was decided to visit Rangoon, leaving Madras on the 25th instant.

The Secretary to proceed to Calcutta, and prepare the papers, &c., for the Commission.

In reference to their visit to the Examiner's Office, the Commission decided that it was required to see what returns and accounts he receives from Arsenals and Factories, and what purpose each serves. Also to consider how far the number of returns, &c., can be reduced.

Colonel Stewart brought to the notice of the Commission, in a letter No. 308, dated 12th October, the opinion of the Inspector-General of Ordnance, Madras, had been asked as to the necessity for the retention of certain depôts.

Correspondence as marginally noted was laid before the Commission.

With reference to Military Department, Government of India, No. 1520 of the 30th October 1874, forwarding papers from the Madras Government and Bombay Government, on the subject of the additional storage accommodation required if Camp Equip-

age were kept in regimental charge; decided to ask Bengal and Madras what stores are usually kept in the regimental store-rooms of Native Infantry, and also to ask Quarter Master General, Madras, for the data on which he founded his estimate of additional cost. Military Department, Government of India, No. 857 of 15th October 1874, to be re-submitted, with the papers regarding Soldier-mechanics.

The Commission adjourned to the Grand Arsenal, in charge of Colonel Thomas, R. A., at 1-30 P. M. They visited the armoury, capable of holding 100,000 stand of arms. The Commission visited the Pattern Room and Harness and Saddlery room.

They visited the Office and inspected the books.

In the course of the enquiry it was noted that all Gaols are supplied by the Ordnance Department.

The rule which obliges the Commissary of Ordnance to see that the money has been paid in, and a Treasury receipt attached is for stores on payment indent, was again noticed.

The Office Journal was inspected, and the necessity for it was discussed.

The yearly return of "Receipts, Issues and Remains" sent to the Examiner, was considered. It was noted that there appeared a doubt whether this return was more than a check as to clerical errors, both monthly and annual returns being furnished from the same sources.

The Gate Book was inspected and showed a record of every package coming into the arsenal or going out.

It was noted to ask the officer in charge at the Mount, the reason for his sending in 3 indents, 48, 49, 50, on 26th October 1874, instead of one:

The course of Indents received appeared to be as follows:

The Indent is registered in the Office, the first line being entered (the contents not being copied) and sent to the Gate Conductor who forwards them to the Godown-keepers concerned, in a cover with columns for dates of receipt and forwarding.

The Godown-keeper writes in pencil on the face of the indent whether he can supply the stores; if not, he sends a Memo. of deficiency to the Commissary of Ordnance, who passes orders on it. The Indent then

goes to the Inspector-General of Ordnance, who passes it or not, as the case may be. With corps in the station or neighbourhood, the Commissary of Ordnance does not know whether the stores are to be supplied. With distant Corps, &c., the Indent is returned to the Commissary of Ordnance. Noted to ask for a Memo. as to course of procedure. No record of the Indent is kept as a whole in any book, in the case of stores supply of which is sanctioned by regulation, and for which only one indent is furnished. It was noted that the Madras Government will not allow the sale of old stores by an auctioneer in consequence of the failure on the part of an auctioneer before he had accounted for the money. Also that Indents for barrack furniture of an exceptional nature, or not furnished by regulation, are checked by the Inspector-General of Ordnance.

The Commission adjourned at 4-15 p. m.



*Minute No. 93, dated 11th November 1874.*

The Commission met at 11 A. M. at the Grand Arsenal, Fort St. George, and continued their examination of the books of the Office.

The "Monthly Report on stores received into the arsenal" was inspected. The pre-audit by the Examiner appears to be unnecessary. It was noted to enquire into this.

Each godown-keeper has a book showing the employment of lascars, &c.

The "Monthly report of materials expended in fitting up and repairing" was inspected. The report included the labor. Books showing the employment of men in each godown were examined.

"General Stores" No. 1 and No. 2, have each a Warrant officer in charge. Average number of men about 6, in each, daily. Packing department, 6; Harness about 6; armoury, 25 men.

In the "Sundry Stores Godown" are employed 35 to 50 men.

"Dismounted Ordnance," 25 to 35 men.

No. 3, General Stores about 8 men.

Ordnance Godown, about..... 20 men.

Repairable & unservicable godown 2 „

Forge workshops..... 40 „

Miscellaneous workshops ..... 120 „

Armourers' shop..... 54 „

Quarter-master's stores..... 6 „

Weekly report of powder and S. A. ammunition is sent to Inspector General of Ordnance.

Small discrepancies in stock are adjusted under the sanction of the Inspector-General of Ordnance.

Material reports of other arsenals, see Minute 92, are not now checked by Commissary of Ordnance, Fort St. George.

Examiner of Ordnance Accounts apparently does not audit this. Noted to ask the Examiner about letter, No. 2,146 of 9th October 1874, shown in material report

The Commission visited No. 3, "General Stores" Godown, containing 12 godowns in all. Stores, Boxes, Tool chests, Tools, Old packing cases. The Day-book is compared every day. The Day-book and Ledger were inspected, also a Suspense-book containing extract from indents. In this, issues are first entered before the entries are transferred to the Day-book. Noted that old iron and steel are entered under different heads.

The Commission visited the gun-sheds containing coast gun carriages and platforms.

The Commission visited

Unserviceable stores 2 small rooms.

Repairable „ 1 „

Constituting 1 charge.

Inspected

No. 2 General Stores, Rope, Tools, Lead, &c.

The Day-book and Ledger were inspected.

In this branch there were 15 godowns. The Day-book is written up daily, but the entries for out-stations of the articles issued to the packing department, are made in a suspense book, but have not left the arsenal. Noted that the Gun Carriage Factory does not keep its own iron or stores generally. Noted that the powder barrel hoops are kept in the Grand Arsenal, because the barrel-making machine is set up at the Bullet Factory.

This store contained iron, general stores, copper sheet, axes, brass, &c.

No. 1, General Store. 3 godowns, containing artificers' tools, cloth, glass, mathematical instruments, &c. Day-book and Ledger inspected.

Extracts from indents entered in Requisition-book.

The Commission visited

*Quarter-Master's Stores.*

Containing 2 godowns, accoutrements, &c., of all descriptions. Day-book and Ledger were inspected.

*The Packing Department,*

The Gate Store holds the Dead Stock stores. The Packing Conductor enters in the book general contents sent of every package, and sends a tonnage statement to Office, showing weight and dimensions.

The Gate Conductor keeps a book showing the Numbers of cases sent out by sea, and another of those sent out by Rail. Stores are sent out by arsenal carts and bullocks the bullocks being supplied by a Contractor, who is paid by the Commissariat.

“Dismounted Ordnance,” or Park Department. The Day-book and Ledger were inspected at the Gate Office, where they are kept. Passes for the gate are required by the gate-keeper.

Visited the “Ordnance Stores,” containing 10 godowns.

The Day-book and Ledger were inspected.

The Commission adjourned at 4-30 P. M.

*Minute No. 94, dated 12th November 1874.*

The Commission met at the Office of Inspector General of Ordnance at 12 noon.

Minutes 91 and 92 were read and confirmed. With reference to Minute 93. It was decided to cancel that part of the Commission, No. 308. Dated 12th October, to Inspector General of Ordnance, Madras, relating to Rangoon and to the opinion of the Inspector General of Ordnance on the necessity for the retention of certain Ordnance Depôts.

It was agreed to visit the Gunpowder factory on Saturday instead of Friday, also to take the Camp Equipage Depôt at the end of the programme laid down in Minute 92.

The Commissary of Ordnance, Fort Saint George, to be asked for a Memo. showing the course taken by Indents from their receipt to their final disposal

The Commission adjourned to the Office of the Examiner of Ordnance Accounts.

Col. Gillilan, Controller of Military Accounts, Madras Presidency, was present. Major Hunt, Acting Examiner of Ordnance Accounts, handed in a list of the accounts furnished by an arsenal and a factory, marked A, and attached. As examples, the accounts furnished by the Grand Arsenal, and by the Gun Carriage Factory were considered.

I. Annual Returns showing the stores remaining on 31st March of each year.

As it appeared to the Commission that the numerous headings under which such stores as metals and tools, E. G. files are classified, are only necessary for the indenting parties, and the godown-keepers, they discussed the advisability of bringing them under such general headings as large, medium and small, and adopting an average price for each division of the article. The advantages would be the lessening of clerical labor, while the disadvantages appeared to be the difficulty of making a fair average price, and that 2 systems of classification would obtain in an arsenal.\*

\* *Note.*—The Manager of the Arsenal appeared before the Commission and gave evidence that the new ledgers with the new nomenclature were not much more numerous than the old ledgers.

It was noted that by printing the headings of names of stores in these lists, much labor might be saved.

The "Stock Book" was produced and it was noted that the columns headed "road remains" and "remains with corps," might be struck out as not required. The Examiner stated that this would set 2 clerks free, who it was suggested might be employed in the compilation of a table showing the quantities of material and labor required on the making of articles of stores.

It appeared to the Commission that the annual list of remains was not an efficient check, the real accurate evidence of the transactions of the arsenal being the ledger, because there is no proof that the list is a true record of the entries in the arsenal ledger.

The system of sending in the Office ledgers at the end of the year for audit, was discussed.

The Examiner and the Controller stated that they preferred a monthly audit as being more efficient, and expeditious, spreading the work evenly over the year.

*Monthly Report of Materials*, expended for making up and repairing articles. The detail of every article made, &c., is given. It is not examined, except clerically.

*Monthly Report on Stores received from Corps, &c.*, exhibiting the repairable and unserviceable articles and the recommendations of the Ordnance Officers for their disposal.

The Commission observed that if this return be necessary, the Examiner has nothing to do with this list in the first instance, and that its pre-audit is unnecessary. But it appeared to the Commission that general regulations should be issued, governing the disposal of stores, and that the authority of the Inspector General of Ordnance should not be required for the disposal of stores received as repairable and unserviceable stores, and duly certified to be so by a Committee, nor should the same authority be necessary for their sale. Where there is no authority to dispose of the stores or where the stores are special, as 'arms,' &c., then the authority of the Inspector General of Ordnance should be obtained. The Commissary of Ordnance should refer to Inspector General of Ordnance when he desires to transfer stores from one heading to the other.

In its reduced form the list might go to the Examiner, subsequently for his information.

#### *Gun Carriage Factory.*

*Half-yearly return* of stores received, and expended and remains and of articles brought on stock from manufacture.

It was noted that no minute check exists as in the Bombay Presidency, of material and labor expended.

The "Annual statement of articles constructed and repaired, &c.," material storage is only examined in a general way, the

totals of labor and material and percentage being shown against the number of articles of one kind made up in the year.

The Half-yearly Journal,  
 " " Return of Tools,  
 " " Stock. In  
 charge in the "Gun Carriage Factory were  
 examined.

It was noted to enquire as to the general percentage charges of the factory and how they are distributed, and to see the "statement showing the proportion of centage thrown on all articles, &c." Noted that regimental pay is not included under the Superintendent's pay.

It was observed that there did not appear to be any necessity for the Journal being furnished to the Examiner, if the Half-yearly Return of stores received is accompanied by vouchers, and the factory giving them for inter-departmental work.\*

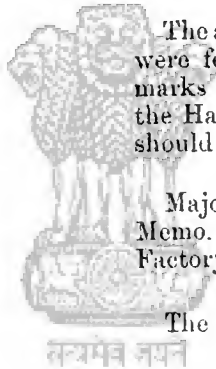
\* As the Annual Statement of Remains contains the whole of the transactions.

The first half-year only contains the articles in which transactions have taken place.

The audit remarks were examined. They were few in number, and there were no remarks as to price. It was suggested that the Half-yearly Return of stores in charge, should be in the arsenal form.

Major Hunt was asked to draw up a Memo. as to the charges in the form of Factory Accounts, which he recommends.

The Commission adjourned at 4-15 P. M.





MINUTES OF PROCEEDINGS  
OF THE  
SPECIAL ORDNANCE COMMISSION.

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*Minute No. 95, dated 14th Nov. 1874.*

The Commission assembled at the Camp Equipage Depôt, Madras, at 11 A. M.

The Camp Equipage Depôt is in charge of Captain Craig, an Officer of the Veteran Establishment and Deputy Commissary of the Ordnance Department.

The Depôt receives tents from the Commissariat, stores them, and supplies tents and parts of tents to out-stations.

The establishment consists of—

- 1 Deputy Commissary.
- 1 Conductor.
- 1 Sub-Conductor.
- 1 Serjeant.
- 15 Syrangs and tindals.
- 93 Lascars.
- 5 Workmen.
- 2 Writers.

The officer, conductors, and stores belong to the Ordnance Department, while the lascars belong to the Quarter Master General's Department, the whole being under the latter Department.

In this establishment one conductor is at the Quarter Master General's Office, and lascars on duty with Government, Commander-in-Chief, Quarter Master General, &c.,—only 53 remaining at the Depôt.

The Commission visited the various go-down stores and small workshops. The area is much crowded, and work has to be carried on in the open on account of want of space. The weekly report of camp equipage, sick carriage, &c., in store was handed in, marked A and attached.

The Commission inspected the office books. These are as per list marked B. Materials required for the repair of tents are received from the Grand Arsenal. The cloth for the manufacture of tents is received from the Rajamundry Jail or from contractors, and is sent to Camp Equipage Depôt for inspection. The Depôt has to work at night when there is a pressure of business. The tont lascars are, however, frequently not fully employed; and Captain Craig stated that their services could be better utilized if the Depôt were allowed

to make up new tents. When parts of tents are required by an out-station, they indent on the Quarter Master General, who orders the Camp Equipage Dépôt to supply them. Tents and doolies are supplied to officers on payment. The officer pays the Camp Equipage Dépôt in cash or by cheque. The transport of tents is made by the Quarter Master General and not by the Commissariat Department. In Madras Presidency no tents are allotted specially for women and children. It was noted that the differences of the three systems on this point should be enquired into. Experimental tents on the Bengal pattern have recently been made at the Camp Equipage Dépôt to compare with those made by commissariat agency and by contract. Noted to ask for the Committee Proceedings on order No. 123 of 13th January 1874, Military Department, Madras, on letter No. 8784 of 11th December 1873 from the Quarter Master General. Captain Craig brought to notice that the Examiner had rated the materials supplied from the arsenal for the experimental tent made by the Camp Equipage Dépôt at stock-book rates apparently,—*e. g.*, Rs. 1 per 1 lb. leather, the bazar price being 3 lbs. for Rs. 1, and similarly Rs. 1 per lb. for cotton-rope, when  $3\frac{1}{2}$  lbs. can be got for the same price in the bazar. Noted to enquire why the “monthly list of stores” is sent to Inspector General of Ordnance, and also the material report. The list of stores received from corps and department is sent to Inspector General of Ordnance, who passes orders thereon. List of books kept up handed in and attached, marked B.

The Commission adjourned to the office, and the Secretary laid before them a list of the places of which he proposed to procure sketch plans, including those already decided on. The list was approved as follows :—

Allahabad.  
 Mhow, and of sites for Fort.  
 Nagpore.  
 Bombay.  
 Kurrachee.  
 Hyderabad (Scinde).  
 Poona and Kirkee.  
 Hyderabad (Deccan).  
 Bangalore.  
 Madras, St. Thomas' Mount.  
 Rangoon.

They afterwards proceeded to the Grand Arsenal and continued their inspection. They visited the armourers' workshops, and inspected the books. The "journal of receipts and issues" does not contain the daily issues of material, but merely the amounts when the job is complete. The daily issues are entered in a "rough day-book," which is the true journal, and the Commission considered the former book to be unnecessary, as the information is given in the "work report." Material is issued to the job from the godown workshops. Every godown has also its own work report; but articles which cannot be repaired in the godown are sent to the workshops. Thirteen sepoys were under instruction as armourers, and specimens of the work (snider actions and parts of the lock) were produced, which appeared to the Commission to be well done. The Commission visited the miscellaneous workshops, and afterwards the forge workshops, which are capacious and worked by steam power;—subsequently visited Caldwell's magazine and the projectile godown.



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The Commission assembled at 9 A. M. at St. Thomas' Mount, and first visited the laboratory. This contains nine or ten rooms. It is now closed, no enfield rifle cartridges being now made; but it is opened and examined three times a week. *Minute No. 96, dated 16th Nov. 1874.*

The Commission then visited the "reserve powder magazine." This is incomplete, but is intended to contain the reserves of powder for the Madras Army. The Commission adjourned at 11 A. M., and re-assembled at 12 noon, to take the evidence of officers commanding batteries.

In the opinion of Colonel Leslie, Commanding Royal Artillery, no delay takes place in the supply of ordnance stores.

Colonel Leslie, Commanding R. A.

Major Rawlins, Commanding A-20th Royal Artillery, stated that his artificers could repair wood carriages. Had iron carriages fifteen months and found no repairs necessary as yet. There were few repairs required in O. P. carriages, except that the axle-tree beds used to split sometimes. Is not prepared to say that all repairs can be effected, as he has not got the Whitworth stocks and dies. If these be supplied, all repairs can be done, as he has an efficient establishment of European artificers. The native establishment are usually efficient, but at the present time has bad workmen. Was at a station in Bengal for fifteen months where there was no arsenal. Battery establishment did the work, and the battery was returned into store, and nothing had to be paid for the battery.

Major Rawlins, Commanding A. 20th R. A.

*Harness.*—English harness will have served eight years next spring. Contract with present harness does not pay. Considers that Government gives a contract allowance and a set of harness every eight years, but it may not be absolutely unserviceable at the end of that time. The scale of leather allowed at Home is not sufficient for India. At Home the battery is restricted to the scale of the equipment table. In his battery had harness and saddlery issued shortly after the Crimean War. Was on a board on Major Thornton's harness;—found that the interior of the backbands was made of old cruppers.

## II.

The battery marched from Madras. Took over a Bengal battery; camp equipage complete. The tindals and lascars repaired small defects; deficiencies had to be paid for. Returned the Bengal equipment into Nagpore Arsenal. The camp equipment was taken on.

Required three guard tents for the battery when an outbreak of Loodiana fever took place;—took three days to get them from the Arsenal, and the men were out in the open all day. The Colonel had countersigned the indent. Did not attribute the delay to the Ordnance Department.

## V.

Could do barrack furniture if the wood were supplied; has extra men working in the shop. Could not afford to keep up a large stock of wood,—paying for it in advance. If Government could supply the wood, could do the work.

Men are paid two annas per hour of a day of eight hours, and four annas per diem for natives and charged to job. Does a good deal of work for the station. Could compete with native prices, work for work of equally good quality.

## I.

Major Thornton, R. A., Commanding B-20th Brigade, Royal Artillery.

Was at Thayetmyo;—was isolated. Does not recollect getting new stores to replace the old and bad ones he had. Does not know any reason for not getting them. The battery would not have been efficient on service. Gets stores at St. Thomas' Mount, but has not proper sights to guns.

## II.

C. E. in the Grand Arsenal.

## IV.

Artificers sufficient and efficient. Can repair carriages.

Does extra station work; builds carts, &c., in the shops. The work is much better than native work. Could undertake barrack repairs if wood be supplied.

*Harness.*

English harness, a year in use, is very bad; the whole is bad.

The Commission adjourned to the Dépôt under charge of Captain Twynam, R. A., who has charge of all the ordnance establishment at the Mount. At the Dépôt are manufactured fuzes, tubes, rockets, and all combustible matériel. The Cap Factory is not now working. Fulminate of mercury was made at the laboratory. The Commission visited the gun sheds, containing the second line of wagons for the batteries at the Mount. Distribution statement of establishment, detail of duties of warrant officers, distribution of lascars attached, handed in, marked A, B, C respectively, and attached. The Commission inspected the

siege-train, &c., carriages. All carriages made at the Government Carriage Factory are sent to the Depôt. The Commission visited the carpenters' shops, the general store godown, and the fuze rooms;—inspected the books, and found that the stores issued daily for work are kept in a "suspense book." The "journal" is a misnomer, the stores being put down to the complete job. In this branch one serjeant, one laboratory corporal, one laboratory man, and thirty-eight lascar boys are employed. No work is done in the rainy season. *Friction Tube Room*—one man files 225 daily. The Percussion Cap Factory was visited. The field train sheds were inspected. There are one serjeant, one tindal, and twenty lascars for keeping in order the whole Depôt. The Commission visited the office, and inspected the ledger, journal, &c. In this latter book the labor is shown.

Adjourned at 2½ P. M.



*Minute No. 97, dated 17<sup>th</sup> Nov. 1874.*

The Commission met at 11 A. M. to take the evidence of the Quarter Master General and Commissary General on points connected with their duties and the objects of the Commission.

*Camp Equipage.*

Brigadier General Howlett, C. B.,  
Quarter Master General.

Notice is given to Inspector General of Ordnance as to number of tents required; Inspector General of Ordnance budgets for them. Tents supplied by Commissariat Department; they are surveyed by a committee and handed over to Camp Equipage Depôt. At some stations there are full equipment; at others two-thirds, and at others half only, and different proportions for Europeans and natives. No allotment for families when a regiment marches; the tents for the families have to be drawn from the general stock.

There is a reserve of one hundred tents, &c., at the Camp Equipage Depôt, and an extra reserve in Burmah. This number was not taken into account in estimating the number of tents which would be required were the Bengal system applied to Madras.

No special reserve for cholera camps. At Bangalore camp of exercise there was a pressure for tents, and these had to be drawn from other stations. In case of such a force as the camp of exercise being put into the field, a similar pressure would be felt.

It has been tried to get the tents made at the Jails, Rajamundry, for instance.

British regiments no tent lascars; native infantry only have one tindal and eight men.

Native infantry regiment gets four tent lascars in addition on marching; British regiment gets about two per cent.; total thirty-five, including families.

Does not think the system throws excessive work on the Quarter Master General's Department. Considers that the tents are better looked after in ordnance charge. In the northern district the native infantry regiments have their own tents; but does not know if there has been any extraordinary expenditure. In the native infantry regiments the store lascars do the duty of tent lascars; they are worked in the lines, and do duty as bildars. They are taken into account in calculation when a native infantry regiment is equipped for march. Is not aware if anything has happened at Bangalore as to Camp Equipage.

Allotments are made with reference to the probable requirements of the station in a military point of view. The whole of the force at Kamptee could not be put under

canvas at once. The plan and cost for troop store-rooms takes into account sheds for sick carts.

If allotments were made for the families, then 20 to 24 E. P. tents would be wanted for each of the nine regiments, at 383 per tent, Rs. 82,728.

Is made up by the Commissariat Department, except soldiers' boxes.

There are two systems: At some (five) stations, barrack masters; at others under the staff officers, as Cannanore, Trichinopoly. Does not know of any reason for the supply of soldiers' boxes by the Ordnance Department instead of the Barrack Department.

Indents are checked in the Quarter Master General's Department. There are no rules extant in a complete form.

There is no list showing barrack furniture to be supplied.

All cloth for the manufacture of tents is to be got from jails if possible.

All the tents made from jail cloth are made up by commissariat agency; but a considerable proportion is made up by contract. The jails are unable to give sufficient cloth for the wants of the army, but they are increasing the outturn. All tents are made or procured in Madras, and local resources have never been tried at up-country stations.

The Bengal pattern cloth is better than what is obtainable in Madras.

First, about one year ago, all repairs by departmental agency. Now at some places by contract, and at others by departmental agency. A workshop is maintained as at Secunderabad.

In the Commissariat Department there has been found no difficulty in getting contracts all over the country.

The marginally noted correspondence\* was laid before the Commission and ordered to be recorded and circulated. Minutes 93 and 94 were read and confirmed.

As directed in Minute 92, Military Department, Government of India, No. 887 of 15th October 1874, was resubmitted with the papers on "soldier mechanics" and the report by the Commission. Ordered that no action need be taken on above letter.

The Commission adjourned at 2 P. M.

See Proceedings, Madras Government, 270, 16th July 1874.

Barrack furniture.

Col. Loudon, Commissary General.

Barrack furniture.

\* From Inspector General of Military Works, Bengal, No. 6485, dated 17th October 1874.—Statement showing stations where regimental magazines, according to standard plan, exist in Barracks and lines.

From Inspector General of Ordnance, Poona, No. 6867, dated 23rd October 1874.—Statement showing the number of small arms cleaned and repaired in Grand Arsenal, Bombay, and material expended thereon in 1870-71, 1871-72, and 1872-73.

From Assistant Quarter Master General, Hyderabad Subsidiary Force, No. 673, dated 26th October 1874.—Memorandum conveying information on certain points connected with the work of the Commission.

From Inspector General of Ordnance, Bengal, No. 816, dated 20th October 1874.—List of machinery required to increase the outturn of the Small Arm Ammunition Factory, Dum-Dum.

From Inspector General of Ordnance, Poona, No. 6882, dated 24th October 1874.—List of machinery required for the Small Arm Ammunition Factory, Kirkee.

From Inspector General of Ordnance, Poona, No. 6960, dated 27th October 1874.—List of stores that have deteriorated in the Grand Arsenal, Bombay, in the past three years.

From Quarter Master General, Poona, No. 1226, dated 28th October 1874.—Memoranda on the lines of communication from Poona and Bombay,—the strategical value of these places, &c.



*Minute No. 98, dated 18th Nov. 1874.*

Colonel Dalycell, Commanding 1-21st  
R. N. B. F.

The Commission met at 11 A. M. to take the evidence of Commanding officers.

I.—No delay. Has never been at stations remote from an arsenal.

II.—Indents on Quarter Master General's Department. Has no experience of delay. At Bangalore when the camp equipage was handed over to the Quarter Master General's Department, no charges were made against the regiment. Found no inconvenience in the present system.

III.—No storage. No suitable magazine. Ammunition 200 rounds in deposit in the arsenal charge. Merely gives a receipt for ammunition drawn. Thinks it better for a regiment to have its own ammunition.

IV.—All repairs can be done regimentally.

V.—Private regimental workshops, shoemakers and carpenters.

Thinks that the scale of remuneration would be too small to repair and make barrack furniture, even if there were workshops. Has heard complaints of the prices charged for private work. Men in the workshops are not excused guards and regimental duties. The men are not easily got to the workshops. They say they are paid enough without it.

Colonel Hilliard, Commanding 13th  
Native Infantry.

I.—From Grand Arsenal. Has only been at Hongkong, Palaveram, Madras and Burmah.

II.—No camp equipage in regimental possession. Has had no experience as to any delay. Has no storage room. The present store-room has to hold arms, Quartermaster's stores.

III.—Ammunition is in the arsenal; the ammunition kept by the regiment is 90 rounds of practice, which includes the 20 rounds in pouch. Has seldom known any regimental magazines. No delay. Does not think that the service ammunition need be in regimental charge; but it would be inconvenient if the practice ammunition were not in regimental charge, as the regiment would have to be indenting for small quantities. There is plenty of room in the magazine.

IV.—All repairs to arms and accoutrements can be effected regimentally. Two sepoy armourers and a chuckler; can do the browning when the apparatus is supplied.

I.—Commands the battery in the fort, Captain Seacome, 7-5th Royal Artillery. and is Inspector of Ordnance on the works. There are—

20	68-prs.
3	7 „ A. G.
3	32 „
31	24 „
1	18-pr.
1	12 „
1	6 „
1	8 „ gun.
3	10 „ mortars.

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64

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63 are mounted and  
1 68-pr. on Clive's Battery by  
the Railway Station.

All the stores are in charge. Has side-arms, &c.

Has a Quartermaster-Sergeant, and lascars for the armament; separate from the battery. There are a certain number of guns and carriages, both mounted and dismounted, not under the Officer Commanding Royal Artillery. These are in charge of Ordnance Department. Receives 30 in addition to 130 for battery.

Repairs are done in the arsenal on requisition. Has only tailors' and shoe-makers' shop.

Repairs are done on payment indent. Indents frequent, but has given orders that they shall only go in once a month.

Has been assisted by men from the Arsenal. The cordage and tackle furnished are good. Does not know of deterioration.

Has 5 rounds per 68-prs.,  
„ 27 „ for 7-inch gun,  
„ 250 „ „ 24-prs., part of  
which are in deposit.

The Commission adjourned at 1 P. M.

*Minute No. 99, dated 10th Nov. 1874.*

The Commission assembled at 7 A. M. at the Gunpowder Factory, Madras, under charge of Lieut.-Colonel Childers, R. A.

They visited the Saltpetre Refinery, and the buildings called the "Refinery Square." These buildings were built in 1796. The Commission visited the workshops, and the new dusting and reeling house. In the boiler-room the late flood brought the water two and a half inches above the flood of 1872; but it was stated that for fifteen years previous to 1872 there had been no excessive inundation. The Chief Engineer was of opinion that the railway embankment towards north-east had "bunded up" the water. It was not known whether there had been any investigation into the causes of the extraordinary flood of the past three years. The factory was only stopped for eight days. The C. E. was of opinion that a north-east opening is required. The Commission visited the granulating house. In the boiler-room of the drying house, the floor of which is sunk, the water-level in the late floods reached ten or twelve feet above the floor. The boiler could be raised two or three feet, but if more, the whole apparatus would have to be raised. The "expense magazine" was visited, the final dusting house, the barrelling room, the press house, store room, with machinery which had been in store for eight years (plant for a second drying house is available, except boiler), incorporating house, proof house and range. The Commission then proceeded to the office.

It was stated that the European and Eurasian subordinates and families living in quarters outside the factory are very healthy.

The Superintendent stated that the Gunpowder Factory, Madras, will be complete, with one set of houses for each process of manufacture of the outturn of two sets of incorporating mills, when the dusting and reeling house now in course of construction and the sulphur refinery on the new system are completed. Application has been made by the Ordnance Department, and submitted by the Government of Madras to Government of India, for three sets of buildings, which will afford duplicates of all the principal processes of manufacture, at an estimated cost of Rs. 1,75,000.

All the existing houses are sufficiently traversed for mutual protection, and there is ground on the north-west side of the factory on which the duplicate houses required for the completion of the factory may be erected. The ground is supposed

to be waste and available. It was noted that the—

Nearest distance of factory to	
railway is ...	176 yards.
From centre of magazine to	
nearest part of railway ...	251 "
From centre of factory to an- } chorage ... }	2 miles, 3 furlongs.

Copy of the "morning report" was handed in, marked A and attached.

Forms, &c., in use handed in, marked B and attached. The books were examined; journal,—return of gunpowder and stores in charge,—receipts, issues, and remains,—examined.

An "account current" inspected. This is sent to Inspector General of Ordnance, who forwards it to the Examiner. There is a "daily requisition book" which is the *bond fide* journal, and is kept by a sub-overseer. The "journal" itself is a monthly compilation. There are also books of "daily issues" and "daily receipts," and one showing "issues and receipts on manufacture chiefly." It did not appear necessary that all these should be kept up.

In the "return book" a return of articles made up (not petty repairs) and the labor and material are entered. The list is short.

The "journal" is an office book, while the others are "store-keeper's books."

The Commission adjourned to the Vyersypaudy Magazine, consisting of two magazines, and containing 2,278 barrels of 100-lbs. powder in each. It is under charge of a warrant officer. These magazines are under the Commissary of Ordnance, Fort St. George, who attended the Commission.

The Commission adjourned at 12 noon.

*Minute No. 100, dated 20th Nov. 1874.*

The Commission assembled at 7 A. M. at the Gun Carriage Factory, Madras, in charge of Lieutenant-Colonel Hog, R. A., Superintendent. They visited the timber-yard, and noticed the large stock of timber which was neatly stacked and arranged.

The Superintendent stated that teak was obtained at Rs. 1-11-6, and is now got at Rs. 1-15-10 per cubic foot, and ped-douk was Rs. 1-10-5 per cubic foot, and is now Rs. 2-10-0.

All timber, except Moulmein teak, is kept in log six years to season. Moulmein teak is considered sufficiently seasoned in log when it is received, and after being cut into plank, is considered sufficiently seasoned for any purpose.

There have been some few complaints regarding splitting of timber and ammunition boxes. This may, it was noted, be attributed to insufficient scantling.

Half wroughts are not brought to account by number, but are borne on accounts as timber in half wroughts.

The purchases in Burmah are effected by the Commissary of Ordnance, Rangoon, who goes to Moulmein for that purpose.

The Commission visited the carriage sheds, and the forging and heavy machinery shed, witnessing various operations of the shear-cutting machine, and the Nasmyth's hammers of 30 and 15 cwt., and the bolt forging machines.

The steam hammer department, consisting of four steam hammers and one bolt forging machine, is in charge of one foreman.

The Commission visited the smithy, in which are fifty-six forges; forty-four men are employed under one serjeant. They then visited the school for the Carnatic artificers, &c.: fifty artificers and thirty pupils attend school. A paper giving the subjects taught, hours of attendance, &c., is attached marked 1. The Commission visited the iron godown, and then proceeded to the machine workshops: visited the fuze and friction tube shops, lately transferred to the Gun Carriage Factory. In this are employed—

- 7 Lascars.
- 16 Boys.
- 1 Fireman.
- 1 Filer.

This is in the "general machine shop," which is superintended by one engineer.

The second engineer is in charge of all the forges and steam hammers, &c. In the general machine shop there is one conductor supervising this and the filers. Over the F. and F. T. rooms and turner's shop, containing nineteen men, there is one foreman. Each shop is in charge of a foreman, conductor, or serjeant.

The Commission visited the barrel-making shop; \* the carriage shop (a serjeant instructor is in charge, and has 22 men); the filer's shop (1 foreman and 36 men); the wheeler's shop (1 foreman and 5 men); visited the iron and steel godown, containing general stores, iron, timber, and fuel; visited the wood-machine shop and saw-mills.

\* Lately transferred from bullet factory.

The Commission then adjourned to the office, and examined the accounts and books.

The "annual statement" of expenditure was examined, and the Commission observed as follows: A standard book has been compiled showing the labor and material expended on each article: this has been obtained by making up a pattern of each article under accurate supervision; the labor and material, including wastage, being recorded. The method by which wastage incurred in cutting up logs seemed to be complicated, and founded on an empirical rule.

In the "annual statement" the expenditure is placed under the following heads:—

1. Value of material.
2. Centage for waste of material.
3. Total value.
4. Value of labor.
5. Centage.

Wastage is allowed for as follows: In working up timber and iron, 25 per cent. on the material issued, and 8 per cent. on brass.

The number of men under "labor" are according to the standard book before mentioned. It does not follow, however, that this tallies with the actual total monthly pay of the workmen. The difference, if any, is charged to No. 5, "Centage;" and the same with regard to material.

There did not appear to be any "account current."

The Commission adjourned at 12-30 P. M.

*Minute No. 101, dated 21st Nov. 1874.*

The Commission met at the Gun Carriage Factory, Madras, at 11 A. M., and continued their examination of the books, &c. These were taken in the order by the list furnished by the Superintendent.

Log, when received, is entered by the timber branch in No. 46, and when issued in No. 10. Scantlings are not borne on the ledger, but can be entered in "list of timber cut up." The Commission observed that this and the timber branch "list of timber received" might be brought into one, and in the form of the first showing the history of the log. This should be in the branch, and sent for when required. There should be a half-wrought ledger, which should show serviceable and unserviceable scantling. All that appear necessary under this head are the—

Timber register.

„ cut up book.

And it seems a question whether it is necessary to retain the office books—

Timber register.

„ cut up.

It was noted, however, that the office form of "timber cut up" was more adapted to the purpose than the branch "timber cut up" book.

Planks and half-wroughts are not shown in the ledger, but merely under timber half-wrought.

There is no ledger in the office, but the half-yearly return contains planks and scantlings.

Books Nos. 9, 45, and 47 were examined, *i. e.*—

9, Office book of issues

Godown „ „

and the information in the others was contained in No. 9. The Superintendent gives sanction to the use of stores *after* they are drawn for the job.

The Commission noted that 9 and 45 were not required, the latter being in the half-yearly return. No. 47—memo. of timber issued in logs—is required. No. 12—*Estimates*: These should be called statements.

There is no dead stock ledger except for tools and machinery, so that there is no account of dead stock.

A log issued to department as dead stock has no appendix ledger to vouch for

it, but is written off the half-yearly return, not as a separate transaction, but is lumped amongst others. Nos. 15 and 55—the register of carriages—appear to be required.

It was noted that it would be useful to know what the system of the Woolwich factories is as to accounting for material, labor, &c.

The Commission directed that the Inspector General of Ordnance should be addressed, suggesting the advisability of reducing the number of books, and that the Superintendent should take the matter up.

Adjourned at 3-30 P. M.





*Minute No. 102, dated 23rd Nov. 1874.*

The Commission left Madras by the 7 A. M. train for Avady, one of the sites proposed for the ordnance establishments, ---inspected the ground, and discussed the papers on the subject. A minute on this subject by the Secretary was submitted to the Commission.

The Commission returned to Madras at 12 noon and adjourned.

They re-assembled at 5 P. M., and inspected the sea face of Fort St. George, accompanied by Colonel Campbell, R. A., Acting Inspector General of Ordnance; Colonel Thomas, R. A., Commissary of Ordnance; Colonel Goddard, R. E., District Engineer; Captain Seacome, Commanding Royal Artillery.

Adjourned at 6½ P. M.



*On board B. I. S. " Oriental."**Minute No. 103, dated 3rd Dec. 1874.*

## PRESENT :

MAJOR GENERAL TURNER, *C.B.*,  
*President.*COLONEL HATCH, *R.A.* }  
,, STEWART, *R.A.* } *Members.*  
A. L. HALIBURTON, }

Colonel Stewart, Acting for Secretary.

Agreed to visit Arsenal at Rangoon to-morrow, the 4th, and to meet Assistant Quarter Master General, Executive Commissariat Officer, Officer Commanding 45th Regiment and his Quartermaster, and Officer Commanding Royal Artillery at Arsenal, on Saturday, the 5th instant, at noon. Discussed question of duration of stay. Agreed that the final decision as to this, should depend upon the amount of work which should be found necessary. The Commission considered that, if possible, they should leave on Sunday, the 6th. Wrote to Assistant Adjutant General to report arrival and permission to visit Arsenal and to request attendance of officers above named; and to Assistant Quarter Master General, requesting that passages might be secured for Calcutta, with alternative of boats of 6th and 13th.

Adjourned.



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Minute No. 104, dated 4th Dec. 1874.

- (a).—Register of indents received from corps and departments.  
 Journal of receipts and issues.  
 Ledgers (office).  
 Material reports.  
 Store reports.  
 Invoice book.  
 Requisitions and indents for stores.  
 Audit book.  
 Morning report book.  
 Lists of probable demands for petty stores.
- (b).—(Appended)—
1. List of books and files kept in office.
  2. Present state of establishments at Rangoon.
  3. Present state of establishments in the division.

Immediately on landing from the steamer, the Commission (with the exception of the Secretary who had gone direct to Calcutta from Madras on duty) proceeded to the Ordnance Magazine, Rangoon, at noon and assembled there. They examined the books noted in the margin (a) which are kept in the Magazine Office. The Commissary of Ordnance also handed in a list (b) of all books and files kept in the office, together with present state of the ordnance establishments both at Rangoon and at the outposts of Thayetmyo and Tonghoo. The new ledger, in accordance with the recently introduced nomenclature, was found brought up to 30th June only, and the Ordnance Officer stated that the arrears had been caused by the heavy pressure of work entailed by its introduction. He also stated that there is in Rangoon a very great demand for clerks, and that he cannot get men for the amounts at his disposal, the merchants offering much more, as far as Rs. 100 and upwards, and that another cause of delay was owing to the fact that the old ledger books had just been finished when the new nomenclature was introduced, so that he had to await the receipt of new printed forms from Madras. (*N. B. by A. S.*) As the new forms had to be in the new nomenclature, the delay was unavoidable, as it was unadvisable to send any of the old stock of forms, which had become useless. Ordnance Officer informed Commission that supplies could be sent to Tonghoo by boat only at the new and full moons, at which times only is there a sufficiency of water in the "Kyassoo Creek," which connects the Pegu and Sittang rivers; but that a canal was in process of construction, by which it is hoped that this difficulty may be avoided in the future. The Commission resolved to ask the Assistant Quarter Master General, British Burmah Division, by what time this canal may be expected to be opened?\*

\* Done next day (A. S.)

In reply to a question from the Commission as to whether there would be any difficulty in, or objection to, supplying regiments or batteries at out-stations in the division with stores *direct* from Rangoon, instead of through the agency of the ordnance depôts at such stations, the Ordnance Officer stated that he did not consider there would be any objection,—always provided the regiments or batteries kept on hand a supply sufficient to last whilst the stores were in transitu.

The Commission then entered into the question of landing and shipping and

transport of stores, both across sea and by steamer and boat inland. The Ordnance Officer handed in some copies of "*Rules for landing ordnance stores at Rangoon*," as also the papers noted in the margin (c). The rules for landing stores were prepared in the Ordnance Magazine, in communication with, and with the approval of, the Chief Commissioner, British Burmah Division, the General Officer Commanding (in the Quarter Master General's Department), and the Master Attendant: and were finally sanctioned by the Inspector General of Ordnance and Magazines, Madras.

The Commission called for information as to the allotments to be maintained at the three ordnance establishments in the division; and the Ordnance Officer stated that the one for Thayetmyo was prepared, but not yet sanctioned by the Inspector General of Ordnance, to whom it was about to be transmitted for that purpose. That the one for Tonghoo had also been prepared, but had to be returned for sundry corrections, and that the allotment for Rangoon was under preparation, but has to be kept in abeyance, pending definite information as to the armaments, &c., to be maintained. The Commission resolved to request the Ordnance Examiner, Madras, to be good enough to furnish them with the loan of a copy of the "*annual return of military stores*" for the out-stations of Thayetmyo and Tonghoo; and to ask the Inspector General of Ordnance, Madras, for a copy of his Circular Memo. No. 80, dated 24th July 1874, on the subject of the allotments to be maintained in ordnance establishments generally. Also, resolved to call for similar information from the other two Presidencies.

The Commission found that the magazine was divided into the following charges; each as far as No. 7 under a separate Warrant or Non-Commissioned Officer:—

1. Armoury.
2. Laboratory and Gunpowder magazines.
3. Gun sheds.
4. Camp equipage.
5. General stores godown.
6. Quartermaster's godown.
7. Ordnance godown.
8. Workshops, (under the master armourer).
9. Receipt and Issue godown (gate conductor).

(c).—List of probable demands for carriage of Ordnance Department stores to Tonghoo for 1875-76.—(*Ordnance Department on Commissariat Department*).

2. Form of bill for boats from Rangoon to Tonghoo, priced by Commissariat Department.—(*Ordnance Department on Commissariat Department*).

3. Form of memorandum of freights registered.—(*Ordnance Department on Agents of Steamer Companies*).

4. Form of application for cattle for conveying military stores from Ordnance Department.—(*Ordnance Department on Quarter Master General's Department*).

The Commission observed that one of the warrant officers (Sub-Conductor Glen) was employed in the office; but the Ordnance Officer stated that this was only a temporary measure, consequent on the pressure of work in bringing up the ledgers, which were five months in arrears owing to the causes already stated; and that Mr. Glen takes his regular tour of landing and shipping stores and duty.

The Commission then proceeded to visit the various godowns, store-rooms, gun-sheds, &c., and examined the books of the store-holders. The system pursued appeared to be in accordance with the regulations of the department; and the books well kept and up to date with the new nomenclature of stores. The store-rooms were amply sufficient and in good order; and the Commission considered that there is also plenty of space for more stores if required. They observed in the workshops that the Carnatic Ordnance artificer foreman apportioned the labor, &c., on specified jobs as follows:—

Say a certain quantity of iron required (*e. g.*, 2lbs. for a hook with thimble), a wastage of 4 oz. in the lb. was allowed for ordinary "scrap" iron, and of 2 oz. for good English iron. The foreman judges as to the time required by what he would take in performing a similar job himself; and if the workman takes longer, he is reported, and punished by fine or otherwise, as the case may be. If all be right, the job, the expenditure on material and labor, are then and there entered in the book of work.

The Commission adjourned at 4 P. M.

The Commission re-assembled at the Ordnance Magazine, Rangoon, at 10 A. M., and continued their inspection of the store-rooms, gun-sheds, magazines, defences, &c. The new magazine on the south face of the lower terrace of the Shōe Dagon Pagoda is within the Arsenal enclosure, and but a short distance from the laboratory, which latter is itself only a few yards from the armoury office, &c. This magazine is still in charge of the Department Public Works, and is not quite finished, although but little remains to be done to the magazine itself. The Commission observed that there are no traverses or other enclosures between it and the neighbouring gun-sheds, &c. It is bomb-proof, with a wooden floor, and constructed to hold 1,224 barrels of 100lbs. each. There is very little ventilation, the only apertures for this purpose being small oblong slits, about 18 × 6 inches, pierced through the buttresses at the exterior of the building. There are one central and two side bays of nine and eight tiers respectively. The lightning-conductors do not appear to be made on the latest principle.

The building appears dry and otherwise well suited for a magazine; but the Commission consider it should not have been erected on its present site, in the very midst of much valuable property. They therefore recommend that before it is used as a magazine, substantial traverses should be erected between it and the neighbouring ordnance buildings.

The laboratory has a brick and chunam floor: it should be boarded; but the Commission consider the site very objectionable, in such close proximity to the various godowns, office, &c. The roofs of the principal store-rooms are of corrugated iron, and generally in good order, notwithstanding the dampness of the climate and the heavy monsoons to which they are exposed. The Commission called for a "*statement of cast-iron and bronze ordnance*"\* in charge of the Ordnance Officer, showing the nature of the carriages on which mounted, &c. Also, for a "*distribution statement of the ordnance artificers and store and tent lascurs*,"† as the same stood on the 5th December.

The outer magazine, in which all the powder is at present stowed, stands outside the Arsenal enclosure at the north-western angle of the third or lowest terrace of the Shōe Dagon Pagoda platform, and is capable of containing, in the eight bays already erected in its east and west wings, 560 barrels of 100lbs. in each wing,

*Minute No. 105, dated 5th Dec. 1874.*

• Received and appended (A. S.)

† Received and appended (A. S.)

or 1,120 barrels in all. There is a central compartment in which is stowed, in wooden cases as received, the powder kept in deposit for the merchants of Rangoon. The building is only fit for use as a temporary magazine, the roof being merely of corrugated iron over an ordinary roof.

The native guard-room is within a few paces of the magazine.

The "gate conductor" keeps a "*register of indents and requisitions*." Each demand, when received, is taken round by him to the various godowns; the storekeepers concerned enter in pencil on the face of the requisition the number of quantity available for issue. For any articles demanded, but not on stock, a slip is sent to the Ordnance Officer, who, in case of approval, directs a corresponding demand to be made on the Grand Arsenal, Fort St. George. Gate conductor is held responsible for a prompt compliance with indents.

The Commission next visited the camp equipage godowns, which are in the upper story of the "ordnance" and "general store" godowns. They appeared dry, roomy and well ventilated. The total transactions in the Arsenal as regard issues of stores are about eighty-five monthly.

At noon the Commission proceeded to record the evidence of the following officers on points referred to them for information:—

Colonel Walker, v. c., Commanding 45th Regiment.

Quartermaster Higgins, 45th Regiment.

Lieutenant-Colonel Horne, Commanding Royal Artillery, British Burmah Division.

Lieutenant-Colonel Walker, Assistant Commissary General, British Burmah Division.

Lieutenant-Colonel Elliot, Assistant Quartermaster General, British Burmah Division.

Lieutenant-Colonel Walker was requested to be so good as to furnish the Commission with a memorandum showing the modes of obtaining and the rates of *freight between the ports of Rangoon and Madras and between the former and the frontier posts*.\* Lieutenant-Colonel Elliot was also asked for a memo. of the *magazine accommodation for regiments at Rangoon*.†

\* Received and appended (A. S.)

† Colonel Walker.

ORDNANCE MAGAZINE, RANGOON, AT NOON.

*Stores supplied through Ordnance Department.*—No delay whatever. Was at Seetapore (Oudh) and did not get them so quickly as in Madras. Cannot, however, say that there was any practical difficulty. Was supplied from Allahabad. At Benares had to get stores from Calcutta, although Allahabad was much nearer. Indents had to be sent to Calcutta. Camp equipage is in charge of Ordnance Department. Regiment only has entrenching tools in addition to pioneer's ditto. Does not see any advantage in this province in having camp equipage in regimental charge. No regular camping grounds. Thinks Bengal system very good. In his previous regiment got new tents before allotted time without any trouble; tents had been used with cholera camp at Meerut. If camp equipage were in regimental charge, would want a large addition to store-rooms, and an establishment, as in Bengal, to look after them. In this country damp would affect the tents much, and they would require more people to look after them. Regiment has service ammunition (20 rounds in pouch + 180 in magazine + 100 practice) in regimental magazine. Prefers this system. Magazine is small; has no external wall, and is dangerously close to the barracks. Is fitted with single trestles, instead of three-shelve trestles as in new regulation magazines.

*Equipment.*—Can repair pouches; but extensive repairs to Arms require them to be sent to arsenal. Does not think allotment of armourers' tools sufficient. All good armourers have a large stock of extra private tools. Armourers had to travel to detachment to execute its repairs. There are regimental workshops, and have done work for Commissariat. Put up arm-racks in barracks and for 39th Native Infantry; also shackle chains for elephants. Men are excused their regimental duties as much as possible, such as guards, &c. Does not think workshops are of much use. The men employed don't put money in Savings Bank; but if single men, drink extra. Does not think employment of soldier labor answered in England.

The regiment was divided between Thayetmyo and Tonghoo. Stores ordinarily procured without delay. Was delay in procuring rifle stocks; they were sent from Madras after regiment had arrived in Rangoon. Indents are at once sent in for any casual requirements,

Colonel M. Walker, Commanding 45th Foot.

f Quarter Master Higgins, 45th Regiment.



Lieutenant-Colonel P. D. Home,  
Commanding Royal Artillery.

say several times a month. If delayed for quarter or half a year, would interfere with efficiency, during annual practice especially. Got stores at the out-stations with sufficient promptitude in general.

*Stores supplied by Ordnance Department.*—No difficulty whatever. Only service guns in charge of Royal Artillery at Rangoon, are four 8" howitzers, mounted on pagoda works. No difficulty in supplying out-stations; the batteries there are mainly dependent on Rangoon magazine, the depôts not having much in hand; but even when had to get new stores from Madras in connection with the new rifled 9-pounder M. L. guns, received them with sufficient promptitude. Has inspected both out-stations, and found easily supplied.

*Harness.*—Harness in 1872 had served four years, and was quite serviceable, but in 1873 was just the reverse, although climate is less damp than that of Rangoon. It was English harness. C. E. has none, &c., as before.

*Equipments.*—The battery at Thayetmyo is quite able to keep itself efficient for the field irrespective of Ordnance Department, provided they have the proper supply of half-wroughts, &c. European and Native artificers are efficient and complete for the field battery; but Tonghoo battery is in a state of transition\* and has no European establishment of artificers.

\* From S. B. to rifled equipment.

Lieutenant-Colonel Walker, Assistant Commissary General, British Burmah Division.

To Tonghoo freight rates this year much lower than ever before, or likely to be again. Mr. Cohen, contractor, tried a steamer on Sittang,—made three trips, all of which failures; got aground near Tonghoo, and could not get through "Kyassoo Creek." One or two boats lost annually in the bore of the Sittang river. Has never sent stores to Tonghoo by road; and it would only be practicable in the cold season—even if then.

Elephant gear lasts about a year, but don't keep any stock beyond absolute requirements. Supplies (local) easily obtained. Workmen to be had, but very dear. Has this year included Ordnance Department boats to ships in his contract; Ordnance Department to pay the bills. For Tonghoo, Commissariat supplies boats, but Ordnance Department stows them. Civil Department furnishes carts to boat on requisition from Ordnance Department. Could undertake the landing and shipping of Ordnance Department stores if he had European sergeants available; present establishment would not be enough.

Natives would receive no attention whatever from ship's officers; practically they are shoved out of the way. Will furnish memorandum of freight.\* For supplies and repairs of barrack furniture &c., occasionally employs regimental workshops.

\*Received and appended (A. S.)

Road to Meeaday very bad in wet weather where creeks are across it. Practicable in ordinary weather. Road to Tonghoo is only complete to Pegu; a first class road, bridged; it is being progressed with, and will be practicable at all seasons; but Engineer-in-charge stated a few days ago that the unfinished portion is quite impassable for troops; and won't be ready for a long while. Nothing being done between Thayetmyo and Tonghoo. Route between these is practicable for troops, so far as men's marching; but no carriages could go. Will send Minute of Chief Commissioner on this route. Dangerous navigation in Sittang; small steamer drew less than three feet and took twenty-five days to Tonghoo.

Lieutenant-Colonel Elliot, Assistant Quarter Master General.

Troops were sent by her, and were very miserable. Commissioner of Pegu drove up to Prome in his carriage; but only one regiment has ever marched it.

The distances between Rangoon and Thayetmyo are as follow:—

By the "Panlang" Creek, —310 miles.

" "Bassein" " 370 "

From Rangoon to Tonghoo by the Pegu river, the "Kyassoo Creek," and the Sittang river is about 200 miles; and by road through Pegu much the same.

Adjourned at 4 P. M.

The Commission met at 11 A. M. at 9, Dacre's Lane, Calcutta. Minutes 95 to 105 were read and confirmed. Correspondence as marginally noted was laid before the Commission and the following orders issued:—

Government, Bombay, No. 448 E. of 28th October 1874.—Plan of Bombay to be submitted when received.

Government, North-Western Provinces, No. 531 of 29th October 1874.—Sample to be sent, and request made for the maps originally made to be filled up.

Quarter Master General, Madras, No. 760 of 23rd November 1874.—Plan of Chart of Rangoon to be asked for from Surveyor General or Master Attendant.

Government of India, Military Department, No. 1113 of 25th November 1874, on the subject of manufacture of Henry-Martini cartridges, D. O.—Enquiry to be made from Military Department as to receipt of Secretary of State's despatches, Nos. 47 and 33 of 25th June 1874, to Bombay and Madras respectively. Ordnance Examiner No. 238 of 4th December 1874.

*Minute No. 106, dated 14th Dec. 1874.*

No. 7962, dated 23rd November 1874, Quarter Master General, Madras.—Map of Nagpore and Kamptec is being prepared.

No. 7967, dated 23rd November 1874, Quarter Master General, Madras.—Details of stores kept in regimental store-rooms and the dimensions of the rooms.

No. 7559, dated 21st November 1874, Inspector General of Ordnance, Poona.—Statement of the average number of extra establishment employed monthly and their cost.

No. 760, dated 23rd November 1874, Quarter Master General, Madras.—Plans of Bangalore and Rangoon.

No. 7958, dated 23rd November 1874, Quarter Master General, Madras.—Informing of the despatch of map of Madras.

No. —, dated 27th November 1874, Military Department, Madras.—Forwards copy of Proceedings for January 1874 regarding alteration and extension of the G. P. Building.

No. 971, dated 23rd November 1874, Military Department, Calcutta.—Regarding office and stores accommodation, &c., for the Small Arm Ammunition Factory at Kirkee, under consideration of Government.

No. 7685, dated 26th November 1874, Inspector General of Ordnance, Poona.—Statement showing the average number of men employed monthly in the Bombay Presidency.

No. —, dated 2nd December 1874, Superintendent, Gun Carriage Foundry, Madras.—Explaining the mode in which centage is charged on all articles manufactured or repaired.

No. —, dated 2nd December 1874, Superintendent, Gun Carriage Foundry, Madras.—Morning report of the ordnance artificers.

No. —, dated 2nd December 1874, Superintendent, Gun Carriage Foundry, Madras.—Morning report of the establishment of the Gun Carriage Foundry.

No. —, dated 2nd December 1874, Superintendent, Gun Carriage Foundry, Madras.—Establishment kept for ordnance artificers' school and subjects taught.

No. 3760, dated 3rd December 1874, Inspector General of Ordnance, Madras.—Statement showing the quantity of gunpowder in store on 1st April 1874.

No. 3751, dated 4th December 1874, Inspector General of Ordnance, Madras.—Period for which harness and saddlery are required to last.

No. 8169, dated 1st December 1874, Quarter Master General, Madras.—Effects of the climate on Cannanore tents.

No. 142, dated 4th December 1874, Inspector General of Ordnance, Madras.—Copies of C. O. Nos. 29, 58, and 55, dated 6th September 1861, 22nd August 1859, and 3rd June 1859.

No. 2384, dated 4th December 1874, Ordnance Examiner, Madras.—Method of calculating stock book rates of ordnance stores.

No. 4889, dated 26th October 1874, Quarter Master General, Poona.—Informing of the despatch of plan of Poona and Kirkee.

No. 448, dated 28th October 1874, Government of Bombay, Public Works Department.—Forwards map of the Bombay Presidency.

No. 531A., dated 29th October 1874, Government, North-Western Provinces, Public Works Department.—Affords particulars regarding the map called for.

No. 3980, dated 3rd November 1874, Commissioner in Sind.—Fortification of Kurrachee Camp and Harbour.

No. 3447, dated 10th December 1874, Inspector General of Ordnance, Madras.—No establishment entertained in consequence of the introduction of the new vocabulary.

No. —, dated 24th November 1874, Superintendent, Gun Carriage Foundry, Madras.—Establishment of the Gun Carriage Foundry at Madras.

No. 1113, dated 25th November 1874, Government of India, Military Department.—Regarding manufacture of Henri-Martini cartridge.

No. 1147A., dated 30th November 1874, Superintendent, Gunpowder Factory, Kirkee.—Outturn of the Factory and expenses during the 1st half-year.

No. 3733, dated 1st December 1874 Inspector General of Ordnance, Madras.—Permanent and extra ordnance establishment in the Madras Presidency.

No. 7822, dated 2nd December 1874, Inspector General of Ordnance, Bombay.—Period for which harness and saddlery are to last.

No. 4738, dated 3rd December 1874, Inspector General of Ordnance, Calcutta.—Number of carriages issued during twelve years ending April 1874.

No. 956M., dated 4th December 1874, Inspector General of Ordnance, Calcutta.—Statement of stock of gunpowder in store on 1st April 1874.

No. 957M., dated 4th December 1874, Inspector General of Ordnance, Calcutta.—Duration of harness and saddlery manufactured at Cawnpore.

No. 1174 L., dated 4th December 1874, Superintendent, Gunpowder Factory, Kirkee.—List of books and forms in use.

No. 1187 L., dated 8th December 1874, Superintendent, Gunpowder Factory, Kirkee.—Amended list of books and forms in use.

No. 595, dated 9th December 1874, Government of India, Military Department.—Employment of officers for the Ordnance Commission.

No. 10485, dated 11th November 1874, Controller, Military Accounts.—Calling for budget estimate for 1875-76.

No. 746, dated 12th December 1874, Government of India, Military Department.—Appointment of Colonel McGregor as Member of the Special Ordnance Commission.

Examiner to be furnished with copy of the Bombay Examination Statement as to the way the stock-book rate is calculated, and to ask for detail as to way of calculating Madras rate.

Controller's, Bengal, No. 10485 of 11th December 1874. Budget Estimate for Ordnance Commission. Reply to be made that it is not anticipated any expenditure will be necessary for 1875-76 on account of the Commission. Inspector General of Ordnance, Bengal, No. 4935 of 12th December 1874, &c., and reply to be made to Government of India, that the Commission do not see any reason for the extra establishment at Bombay and Poona in consequence of the new vocabulary, as none was required in Madras and Bombay; and that no further expenditure should be given.

With reference to Military Department, Government of India, No. 746 of 12th December 1874, regarding the appointment of Colonel McGregor as additional Member, ordered that the necessary papers be sent to him.

Adjourned at 4-30 P. M.

*Minute No. 107, dated 15th Dec. 1874.*

The Commission met at 12 noon. Minute No. 106 of 14th December 1874 was read and confirmed.

Ordered, that the drafts which had been examined by Colonel Hatch should be taken as read.

Abstracts A and B on "gunpowder factories" and "ammunition factories" were laid before the Commission. Sketch of contents of report was laid before the Commission. It was decided to ask Colonel McGregor to meet the Commission at 12 noon to-morrow, in order to inform him of the method pursued by the Commission in dealing with the subject, and to indicate the points on which his opinion would be required; the papers necessary for his information to be supplied to him, and the abstracts and papers to be circulated as soon as possible. That the first subject for discussion is to be the position and number of the factories. Marginally noted letter was laid before the Commission on an additional establishment applied for for the Gun Carriage Factory, Futtehghur. Reply to be made that the additional establishment should be given.

It was decided to form Sub-Committees to deal with the various subjects:—

General Turner to take the Gun Carriage Factory papers.

Colonel Hatch, the Small Arm Ammunition Factory papers.

Colonel Stewart, the Gunpowder Factory papers.

Adjourned at 2-30 P. M.

Military Department No. 894, 15th December 1874.

MINUTES OF PROCEEDINGS  
OF THE  
SPECIAL ORDNANCE COMMISSION.

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*Minute No. 108, dated 16th Dec.*  
1874.

The Commission met at 12 noon. Colonel Macgregor, additional member appointed by Government of India, Military Department, No. 746 of 12th December 1874, to Special Ordnance Commission, joined the Commission.

Minute No. 107 of 15th December 1874 was read and confirmed. Explanation was given to Colonel Macgregor as to the points on which his opinion would be required.

The Commission discussed the question as to the map required. The Commission decided that in the first instance it was only necessary to have the military stations entered on the map or diagram which accompanied the original papers furnished to the Commission. Colonel Macgregor undertook to ascertain from the Surveyor General's Office if this could be done, and the map reproduced.

Ordered, that a form similar to that given in Quarter Master General's, Madras, dated 17th November 1874, showing the camp equipage maintained for the Madras Army, to be furnished to Quarter Master General, Bombay, and similar information obtained for the Bombay Presidency.

It was decided that the following order for the conduct of business should be observed : That at each meeting the subject or subjects for discussion at the following meeting shall be fixed ; and that when discussion has taken place, a decision shall be come to and recorded, and that the point under discussion shall be considered as disposed of, unless any fresh information is received.

The Commission decide that an abstract be prepared on the papers treating of the strategical and military considerations connected with the position of the military factories.

That the papers and abstracts be given to Colonel Macgregor and to the other members of the Commission in succession ; that when these papers have been read and considered by the Commission, they

will meet to discuss them in the following order: Bombay and Poona, Madras, Avady and the Mount, Futtehgurh and Allaha-bad.

That in the meantime the abstracts of papers regarding the details of the factories be continued, and circulated with the papers when ready.

That an abstract of the papers treating of the strategical and military considerations in regard to arsenals be made, and that this portion of the subject be discussed immediately after the papers on the positions of the factories.

The abstract on this part of the subject to be made in the order proposed by the Secretary.

That to enable Colonel Macgregor to read up the papers, and to give time to the Secretary to prepare the various abstracts, the Commission will adjourn till Monday, the members working on the papers which they have undertaken to go through.

Adjourned at 4 P. M.



*Minute No. 109, dated 21st Dec. 1874.*

No. 8420, dated 12th December 1874, Quarter Master General, Madras.—Establishment, Camp Equipage Depôt at Madras, with rates of pay.

No. 2434, dated 11th December 1874, Officiating Examiner, Ordnance Accounts, Madras.—Cost of making up tents, Bengal and Indian pattern, departmentally and by contract.

No. 6440, dated 14th December 1874, Commissary of Ordnance, Grand Arsenal, Bombay.—Intimating that no reductions can be made in his establishment.

No. 415 C, dated 15th December 1874, Quarter Master General, Army, India.—Forwards map of the cantonment, city, and environs of Allahabad, and states that there is no information in his office regarding the water levels at that station.

No. 23-130—5957, dated 15th December 1874, Quarter Master General, Bombay.—Intimates the despatch of plans of Mhow and Bombay.

No. 7011 M, dated 18th December 1874, Inspector General of Ordnance and Magazines, Calcutta.—Daily and monthly outturn of snider ball cartridges from the Small Arm Ammunition Factory, Dum-Dum.

No. 894, dated 15th December 1874, Government of India, Military Department.—Increase of one sirdar and eight or ten ordnance lascars for the Gun Carriage Factory, Futteh-gurh.

No. 26460, dated 12th December 1874, Great Indian Peninsula Railway.—Affords particulars of the rates per ton from Shahabad to Secunderabad for conveyance of goods.

No. 2677, dated 15th December 1874, Commissary of Ordnance, Ahmedabad.—Relative to reduction in the permanent establishment in consequence of being relieved of the duty of supplying and repairing barrack furniture.

No. 1104, dated 16th December 1874, Commissary of Ordnance, Neemuch.—Relative to reduction in the permanent establishment in consequence of being relieved of the duty of supplying and repairing barrack furniture.

No. 8112, dated 14th December 1874, Inspector General of Ordnance and Magazines, Bombay.—Requests certain alterations to be made in the statement of gunpowder which accompanied his No. 8002, dated 9th instant.

The Commission met at 12 noon.

Minute 108 of 16th December 1874 was read and confirmed. Correspondence as marginally noted was laid before the Commission.

Drafts issued, submitted, and ordered to be taken as read.

Report of progress of work was made by the Secretary.

Abstract, Gunpowder Factory, completed, and papers handed over to Colonel Stewart.

Abstract, Small Arm Ammunition Factory, completed, and papers handed over to Colonel Hatch.

Abstract, Gun Carriage Factory, completed and in the press.

Abstract P., strategical, &c., considerations regarding positions of factories, completed and in circulation with the papers.

Abstract, harness and saddlery, &c., completed by Colonel Stewart.

Abstract, camp equipage, completed by Colonel Hatch.

Abstract, system of supply of ammunition, completed by Colonel Hatch.

Abstract of papers on repair and supply of barrack furniture in connection with Abstract, D. Gun Carriage Factory, in course of completion.

Ordered to thank Captain Adams, Deputy A. Q. M. General, Sind, for his papers on the Frontier, &c.

Ordered to thank Captain Colquhoun for his paper on the Military resources of India.

With reference to the Gun Foundry Cossipore, ordered to ask Inspector General of Ordnance for the loan of the correspondence with Public Works Department on the supply of that Department from the Gun Foundry.

With reference also to the above, ordered to ask Inspector General of Ordnance for the loan of papers in book form showing the work done by the Foundry for five years.

With reference to the Shell Factory, ordered to ask Inspector General of Ordnance, Bengal, for information showing highest—

(1.) Possible outturn with present plant and establishment per mensem, working days of eight hours each;

(2.) And what with plant now ordered;

(3.) What additional machinery would be required of the slower-working machin-



ery to bring it up to the rate of the higher-working machinery ;

(4.) And whether additional superintendence will be necessary for the Shell Factory alone.

Ordered to ask Public Works Department whether there are any proposals to connect the Great Indian Peninsula Railway between Patus and Munmur, or other adjacent points.

The Commission, in accordance with the procedure laid down in Minute No. 108, commenced the discussion of the positions for military factories in India, by considering the advantages of Poona as a site for army factories. They agreed to record the following reasons for retaining Poona as the site for army factories :—

(1.) Two important factories have recently been built at a large cost, and there is apparently room for extension.

(2.) That the climate is generally favorable for manufacturing purposes.

(3.) That Poona being on a main line of rail, and with good subsidiary communications in various directions, is sufficiently conveniently situated for the purposes of procuring material and distributing outturn to arsenals and depôts for eventual issue to the army.

(4.) That the position is defensible by land and not open to attack by sea, and is one which would probably under all circumstances be held by a considerable force.

The Commission then discussed the question of the positions of the factories at Madras, and the proposals for removal. They agreed to resume the discussion at the meeting on the 23rd instant.

Colonel Macgregor stated that the maps could be furnished as desired, and it was ordered that these should be applied for.

Adjourned at 4½ P. M.

*Minute No. 110, dated 23rd Dec. 1874.*

No. 820, dated 14th December 1874, Deputy Assistant Commissary, Trichinopoly.—No reduction in his establishment by transfer of camp equipage to regimental charge.

No. 1312, dated 14th December 1874, Commissary of Ordnance, Bangalore.—No reduction in his establishment possible by transfer of camp equipage to regimental charge.

No. 3316 A., dated 15th December 1874, Commissary of Ordnance, Poona.—Regarding reduction in his establishment by transfer of camp equipage to regimental charge.

No. 3923, dated 15th December 1874, Inspector General of Ordnance and Magazines, Madras—Effects of the climate of Cannanore on the arms and accoutrements of regiments.

No. 3916, dated 15th December 1874, Inspector General of Ordnance and Magazines, Madras.—Printed statement of Gun Carriage Factory establishment, and statement showing additional establishment consequent on transfer of the work from the Bullet Factory

No. 405, dated 16th December 1874, Deputy Assistant Commissary, Bellary.—Regarding reduction in his establishment consequent on transfer of camp equipage to regimental charge.

No. 2353, dated 17th December 1874, Commissary of Ordnance, Secunderabad.—Regarding reduction in his establishment consequent on transfer of camp equipage to regimental charge.

No. 1-108—6013, dated 17th December 1874, Quarter Master General, Bombay.—List of stores kept in regimental store-rooms of troops.

No. 1215, dated 21st December 1874, Government of India, Military Department.—Regarding the density of R. I. G. powder for Martini-Henry Rifles.

No. 1281, dated 22nd December 1874, Government of India, Military Department.—Establishment of a Snider Ammunition Factory in Madras.

No. 2136 M. W., dated 14th December 1874, Government of India, Public Works Department.—Requesting return of plans of Gunpowder Factory at Ishapore and Small Arm Ammunition Factory at Dum-Dum.

No. 1250, dated 22nd December 1874, Government of India, Military Department.—Regarding the appointment of an Assistant Apothecary as Master Refiner at Kirkee Powder Factory.

The Commission met at 12 noon.

Minute No. 109 was read and confirmed.

Marginally noted correspondence was laid before the Commission.

Drafts issued laid before the Commission.

Ordered that the correspondence be circulated on days on which the Commission do not meet.

Decided that the Commission will divide into Sub-Committees, dealing with the subjects under clause V of the Instructions of Government.

General Turner and Colonel Stewart to take up the subject of an uniform system of executive work in arsenals.

Colonel Hatch and Mr. Haliburton with the factory and arsenal accounts.

The following additional rules for the conduct of business were read by the President, adopted and ordered to be recorded in the Minutes:—

It has already been determined that in the discussions carried on, members shall speak as addressing the President, who will, after the due consideration of any subject, take the votes of the Commission. But in order to restrict discussion as much as possible to the immediate point under consideration, it seems desirable that the proposition on which a decision has to be arrived at should be submitted in writing to the President, by whom it will be laid before the Commission, and after decision made over by him to the Secretary for record in the Minutes.

A somewhat more clearly defined rule regarding the communications the Secretary may have to make to the Commission seems necessary.

As the nature of his duties necessarily make him more intimately acquainted with the details of the numerous documents, records, &c., in his hands, he will have frequent occasion to bring subjects to the attention of the Commission, and he may also have special knowledge on matters before the Commission which will be most useful to them to possess, and for which they will be obliged; but which, as he cannot take a part in their deliberations, he has not the opportunity of communicating.

The President therefore thinks that the Secretary should be seated near himself, and make his communications to the President,

either *vivâ voce* or in writing, who will, if approved, present them to the Commission.

It is also desirable that the President and members should each be furnished with a copy of the rules laid down for the conduct of business, to which, as determined from time to time, the Secretary will cause any further rules to be added.

Ordered that the Superintendent, Small Arm Ammunition Factory, Dum-Dum, be asked whether he will be able to make up annually as now estimated by him—

14,000,000 balled,

14,000,000 blank ammunition, on the understanding that one-third of this quantity will be Henry-Martini, two-thirds Snider, and that no Enfield ammunition will be required; and whether additional machinery will be required, and if so, what?

It was decided to ascertain from the Superintendent, Gunpowder Factory, what quantity of powder R. I. G.<sup>2</sup>, according to specification, &c., he estimates can be made from one set of incorporating mills in the course of one month of—working days.

The Commission continued the discussion of the position of the factories in India. The following Minute by Mr. Haliburton was read and ordered to be recorded as the opinion of the Commission:—

‘ In considering the question of the positions of the factories, the Commission must evidently be governed to a great extent by the fact that nearly if not all the requisite army factories have already been constructed in India, the question of their sites will therefore scarcely come before the Commission in a practical shape, unless it be determined to build additional factories, or unless reasons be adduced for the removal of existing ones which, in the opinion of the Commission, would justify the outlay necessary for their removal and re-establishment elsewhere.

“ It must be borne in mind that a marked distinction exists between sites suitable for arsenals and those adequate for factories. Arsenals contain not only the stores for the immediate use of the troops, with the necessary workshops for their maintenance, but also the reserves of stores which Government accumulate for the army, and which are the material capital to be drawn upon in the event of prolonged campaigns. It is manifestly of the first importance therefore that arsenals containing such valuable stores should be so placed as to be in perfect safety against

any probable attack and so situated as to form a convenient base from which to equip, launch, and maintain an army.

“The loss of an arsenal with its valuable stores might paralyse for a time the troops dependent on it, and would certainly strengthen any enemy into whose hands it might fall. Two qualities are therefore essential to the site of an arsenal: strength and strategical convenience of position. The same importance cannot be assigned to factories. They contain no manufactured stores, are not engaged in the immediate and direct supply of troops, but solely in replenishing the reserves of stores maintained for the army. If these reserves are kept up to the quantity considered sufficient, the temporary disablement, or even the destruction of a factory, *should* produce no sensible effect on the operations of a campaign.

“If sites were to be selected *de novo*, it would no doubt be most desirable, all other conditions being equal, that factories should be located in positions as strong as those assigned to arsenals, but in dealing with factories already in existence, the Commission do not feel that they would be justified in recommending the large outlay which would be required for their removal, provided they can be made reasonably safe against desultory or tumultuary attacks, and are so placed as not to require a special disposition of troops for maintaining them and their communications in safety.

“The factories in Madras are no doubt unfortunately placed. They can easily be made safe against any local attacks, and their communications with the arsenals which they are intended to replenish would probably be maintained under all circumstances, but they will at all times be liable to possible destruction or disablement by shelling from the sea, and probably no disposition of batteries would render this impossible. This want, however, though possible, is not probable, nor of such importance, if it occurred, as to induce the Commission to recommend that a large expenditure should be incurred for the purpose of removing the Madras factories into positions of greater safety.”

The following was submitted by Colonel Hatch and ordered to be recorded:—

“As regards the Powder and Small Arm Ammunition Factories at Ishapore and Dum-Dum, the Harness Factory at Cawnpore, and the Foundry and Shell Factory at Cossipore, the Commission can

see no sound reason for recommending any change in their location. The views of the Commission as regards the proposed removal of the Gun Carriage Factory from Futtehghur to Allahabad have been clearly stated in their Special Report dated 28th April 1874."

The Commission adjourned for the Christmas holidays until December 29th, when they decided to re-assemble for the discussion of the position and number of arsenals and depôts in India. In the meantime Colonel Macgregor to be furnished with the papers connected with the strategical, &c., positions of arsenals.

The Commission adjourned at 4-30 P. M.



Minute No. 111, dated 29th Dec.  
1874.

Minute No. 110 read and confirmed.

In considering the number and position of the factories, it was agreed to record the following :—

“In amplification of the definitions of the terms arsenal and depôt laid down in Minute No. 2, it is decided that 1st class arsenals are those which are placed at important strategical bases, which supply subordinate or 2nd-class arsenals, or depôts, in addition to the troops dependent.

“2nd-class arsenals are those located at points of secondary importance for the supply of depôts and troops.

“1st-class depôts are those in which a small siege train is maintained, in addition to reserves of ammunition, entrenching tools, and camp equipage for the troops dependent.

“2nd-class depôts are as above without a siege train.”

The following are laid down as principles that ought to guide the Commission in forming their conclusions :—

“That Ordnance Establishments should ordinarily be placed on main lines of communication ; that it is unwise to multiply them beyond the number absolutely necessary for the efficient supply of troops in cantonments or in the field, as each constitutes a point to be defended and occasions a dispersion of troops for its protection.

2. “That each unit of the army should be, as far as possible, self-supporting and independent of an arsenal as far as regards repairs to its equipment.

3. “That the army should be kept supplied by periodical issues of stores from arsenals, and the system of drawing small quantities frequently should be authoritatively abolished, as being opposed to efficiency of corps and batteries, and causing unnecessary trouble and expenditure to the sources of supply.”

In considering the question of sites for arsenals, it was decided to adopt the following order :—To determine, (1st), what arsenals are necessary as bases for the supply of the whole army of India in time of peace, and in any wars, internal or external, which may take place in or near any part of the country ; (2nd), what arsenals are required for the supply of particular districts and as immediate bases for probable operations against particular enemies ; (3rd), what secondary establishments are required as links in the chain between the arsenals in Nos. 1 and 2 in order to complete the supply-communication.

The Commission decided to take the arsenals, &c., in the following order:—

1. Bombay or Poona.
2. Calcutta.
3. Kurrachee or Hyderabad.
4. Madras.
5. Peshawur or Rawal Pindce.
6. Dehra Ismael Khan.
7. Mooltan.
8. Ferozepore.
9. Bareilly.
10. { Agra.
- { Allahabad.
11. Neemuch.
12. Saugor.
13. { Mhow.
- { Ahmedabad.
14. Nagpore.
15. Poona.
16. Amednuggur.
17. Sholapore.
18. Belgaum.
19. Secunderabad.
20. Bellary.
21. Bangalore.
22. Cannanore.
23. Trichinopoly.
24. Rangoon.
25. { Thyetmyo. Tonghoo
- { Aden.

Papers connected with Military Department, Government of India, No. 1141, dated 21st August 1874, on the valuation of articles of Europe supply were re-submitted and extracts from Minutes Nos. 41, 60 and 67 read. Decided to ascertain from the Ordnance Examiner, Bengal, how the percentage added to invoice cost of Europe stores is arrived at for the purpose of forming the stock-book rate.

State percentage of cost of freight.

State landing charges in Calcutta, including labor of ordnance lascars.

Military Department, Government of India, No. 1332, dated 27th November 1874.—Forwarding Proceedings of a Committee at Bangalore and the selection of a site for an entrenchment to contain the Ordnance Magazine was re-submitted to the Commission, and it was decided merely to acknowledge the communication and say that the enclosures would be retained and reported on in the final report of the Commission.

The Commission adjourned at 4-30 P. M.

MINUTES OF PROCEEDINGS  
OF THE  
SPECIAL ORDNANCE COMMISSION.

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*Minute No. 112, dated 31st Dec. 1874.* The Commission met at 12 noon.  
Minute No. 111 was read and confirmed.

In accordance with the decision recorded in Minute No. 111, the Commission discussed the relative values of Bombay and Poona as the site for the main arsenal for Western India.

They resolved that they would adjourn until Saturday, the 2nd proximo, at noon, when they would deliver their views in writing, and that such should be the course on future occasions, in settling the more important questions connected with localities of arsenals and ordnance depôts.

Adjourned at 2½ P. M.





The Commission met at 11 A. M. *Minute No. 113, dated 4th Jan. 1875.*  
Minute No. 112 was read and confirmed.

The meeting for Saturday, 2nd instant, was postponed until Monday, the 4th instant, in consequence of the members having sufficient work to occupy them on Saturday, the 2nd. The discussion on the best site for the arsenal of Western India was resumed, and the following Minutes on the subject were read by the President and members in the order in which they here follow, and were ordered to be recorded in the proceedings.

*Memo. by* **LIEUT.-COLONEL MACGREGOR.**

The reasons I give for preferring Poona to Bombay are: That Bombay, being stationed on our extreme frontier, exposed to attack from the sea, and liable to be cut off from India by two difficult ghâts, is not, and never can be, a fit position for an arsenal.

In Poona, on the other hand, we have an excellent strategic position and a site of great defensive capability; while on political and sanitary grounds it is far superior to Bombay.

It is better placed also both for the economy and convenience of the supply of troops south of the Great Indian Peninsula line than Bombay; and as all the factories of Western India are to be at Poona, the expense of supplying the troops to the north with ammunition and powder, &c., would not be greater.

The expense of removing the arsenal from its extremely bad position in Bombay to a very good one at Poona would be very little, if any thing, greater than would be entailed if it remains where it is, owing to the value the land occupied by the arsenal at Bombay would fetch.

The one advantage which Bombay, at present, has over Poona, may any day disappear, should the proposed chord line between the two branches of the Great Indian Peninsula Railway be sanctioned.

Finally, the highest military authorities in India, Lord Strathnairn, Lord Sandhurst, Lord Napier of Magdala, and Sir Charles Staveley, are all unanimous in favor of Poona.

*Minute by* **A. L. HALIBURTON, ESQ.,** *on the position for the Arsenal in Western India, dated 4th January 1875.*

In discussing the comparative merits of Bombay and Poona as sites for an arsenal, we must bear in mind the larger question of which this particular discussion forms only

a part. That question is, not what are the best strategic sites for certain field forces to occupy for the purpose of threatening or protecting important lines of communication, but what are the sites which the grand or parent arsenal should occupy with a view to the most convenient line and economical supply of warlike stores to subordinate arsenals, depôts, and garrisons throughout India, and to Indian armies in any field where warlike operations may be anticipated?

The grand arsenals are not to be established as bases of operation against any particular section of the country, or against any particular power, though it may, and probably would, happen that they would occasionally meet both these requirements; but they are to be established as bases of supply for all the garrisons of India, and as feeders for armies in any field which can possibly be brought into rapid and safe communication with them. Before coming to the question of these particular sites, two points require to be determined:—

1st.—What are the chief sources of supply of warlike stores to India?

2nd.—To what points in India are these stores most likely to flow in times of emergency?

Having determined these two questions, we can then fix on a site or sites suited for the most rapid, safe, and convenient accumulation of stores, combined with the most varied, shortest, and safest lines of communication for their distribution to immediate or local bases of operation.

1st.—*Sources of supply.*

It may be assumed that England will continue to be, as she is now, our chief source of supply for warlike stores. It is true that the manufacture of a certain class of stores is being gradually developed in India, and in time of peace a largely increased proportion of stores may be locally supplied; but in the event of hostilities in India she will always be liable to be thrown back on England as her chief, if not her only reliable, source of supply. Even in the case of stores manufactured in India, the main sites of manufacture are on or near the seaboard, and it is most desirable that they should always, when practicable, be so located. By being so placed, two lines of communication are open for conveying the outturn of factories to arsenals and depôts. Should the land communications at any time become precarious or choked, stores can be sent by sea from Calcutta or Madras to Bombay

and Kurrachee for operations in Central India or the North-West, or from Bombay to Calcutta, Madras, or Burmah for operations in the south and east. On and beyond the seaboard therefore may be said to lay the great sources of supply of warlike stores for India, and on the seaboard some arrangements must be made for their receipt and distribution.

We now come to the *second point*.

In what direction are those stores most likely to be urgently required in times of emergency?

On this point there will probably be little or no difference of opinion. The distribution of our troops indicates very clearly the quarters in which they are most likely to be required. Small wars may occur with the various native states from Mysore to Rajpootana, and insurrectionary movements may take place anywhere; but no great war can be anticipated from these quarters, and probably no campaign which the local bases of supply which we shall recommend will not amply provide for.

Omitting Burmah as having no great bearing on the question of an arsenal site on the west of India, there seem to be only two quarters in which war on a large scale can be anticipated.

*1st.*—On the North-West Frontier, with possibly a concurrent expedition to Persia.

*2nd.*—On the borders of Nepal.

Granting therefore—*1st*, that we must look for our supplies from abroad or on the seaboard; *2nd*, that the greatest probable demand for those stores in the event of war will be to the north-east or to the north-west, what are the ports at which they should be concentrated for distribution?

A glance at the map settles this question. There are only three possible ports for this purpose—Kurrachee, Bombay, and Calcutta. Kurrachee is out of the question as a primary base of supply. Its only line of communication is with the north-west, and that runs parallel to a hostile frontier and would always be liable to be cut. Calcutta and Bombay alone remain. Both are, and probably always will be, the ports through which warlike stores will chiefly flow into India. Under existing circumstances Bombay has the advantage of being the nearest practicable port to England, and is therefore the channel through which stores can be most

rapidly accumulated and despatched to Central, North-West, and North-East India. It has the further advantage of being the port from which any warlike expedition destined to operate in Persia or on the shores of the Red Sea would sail, and it is therefore doubly valuable as an inward and outward base of operations. Granting that Bombay is the port to which a very large proportion of the warlike stores for India will be consigned, we come to the question before us, where should the arsenal for their receipt, custody, and distribution be established?

I had intended taking the "considerations" laid down in our instructions in their order from A to K; but on looking closely into them, I find that the "strategical and military considerations" in A involve those in C, F, J and K, except as regards the economical aspect of the questions in the last two divisions. I propose therefore to review these "considerations" together, and shall endeavour to show that Bombay is not only strategically the best and most convenient base of supply, assuming it to be safe from capture, but that it is also the most economical site that can be obtained on the west coast of India. It is unnecessary, further, to touch the question of the convenience of Bombay as a port for the receipt of supplies from abroad, and from Indian factories. It is the port nearest at the same time to England and to the heart of India, and those two facts settle in my mind the question of its paramount importance as the port for the importation of stores. I shall therefore go on to consider its importance and convenience as a centre for the distribution of stores to subordinate arsenals and to armies, and compare it in this respect with Poona.

Three great lines of railway converge on Bombay—one runs north to Guzerat, another crosses Central India to Allahabad, and thence runs north-west and south-east to Lahore and Calcutta, with important branches north-north-west to Mhow and east to Nagpore, and the coal-fields of that neighbourhood, while the third leads through Poona to Madras, with branches to Hyderabad and Bellary. At no very distant date rail connection will be opened either between Indore, Ajmere, Jeypore and Delhi, or from Ahmedabad through Deesa to Ajmere and Delhi, and there will then be a second and a shorter route from Bombay to the north-west, the frontier towards which all our military lines should converge. In addition to these communications, good metal roads lead from Bombay

to every part of India. Again, from Bombay there is direct water communication with Kurrachee, and through it to the north-west—to the ports of the Persian Gulf, to Aden, and to every port on the west and east coasts between Bombay and Calcutta. In fact, Bombay stands unrivalled as a centre from which to despatch stores to any part of India, or to countries outside India, where Indian armies may probably be called upon to serve. By removing the Bombay arsenal to Poona, it would be placed at a distance, varying from 86 to 119 miles, from every line of communication, except that to the south and east, which may be said to be the least important of all those which radiate from Bombay; because the country which it traverses can be supplied from Madras with equal, if not with greater, facility, and would be connected with the lines leading to the north-west—the most important in India—to the north and seawards, by a very precarious and difficult line of rail across the western ghâts. On the mere question of strategical convenience for supply purposes, there can be no comparison between Poona and Bombay. When we examine the economical bearings of the case, the same result is arrived at. Leaving out of the question powder and ammunition manufactured at Poona, every supply for an arsenal at Poona would be received through Bombay. The great bulk of stores to be issued from that arsenal would be destined for places to the north-west and north-east of Bombay. Stores so sent from Poona would cost the same as if sent from Bombay, plus the cost of sending them from Bombay to Poona and back again over one of the most expensive roads in India. Stores sent from Poona south and east would, in the first instance, be sent from Bombay to Poona, and therefore no saving would be effected on their transport. Added to this, there would be the cost of two establishments: one for the receipt, custody, and distribution of stores in Poona; another for receiving, landing, and despatching stores in Bombay. On the double grounds of convenience and economy, therefore, it seems to me that it is impossible to maintain any comparison whatever between these two places. The only question which now remains, is whether there is any objection to Bombay sufficiently grave to justify us in recommending that, in spite of all its advantages, it should be abandoned as a site for an arsenal. The only two objections which I have heard urged against it, are: 1st., that in a military point of view it is not

safe from capture or destruction ; and, *2nd*, that the climate deteriorates the stores accumulated there.

With regard to the first point, I am not competent to give any valuable opinion. To suppose its capture by a foreign army landing in India, is to suppose that England will have lost the supremacy of the sea,—a contingency which we are scarcely called upon to contemplate. To suppose its capture by a force from the north or north-west of India, is to suppose the power of England in India shattered, if not entirely destroyed, by a succession of severe defeats,—a contingency equally beyond the bounds of reasonable probability. Two other dangers remain,—destruction of the arsenal by a local rabble, or through bombardment by enemies' cruisers, which might escape our fleet and approach Bombay. The first is a danger which can be easily guarded against ; the latter I can give no opinion upon. If it be possible to provide against it, Government should be urged in our report to do so. If Government will not, or cannot, secure Bombay against bombardment, then we should, I think, recommend that the arsenal be removed to some point in close proximity to the junction of the south-east and north-east lines of railway at Calliance. If it must be moved, it is, I think, clear that its connection with the lines of rail leading to Central and North-West India should not be broken, while it should be kept as near the lines to the north and south-east, and to the port, as is consistent with safety. If this site be found unsuitable, it might then be advisable to select a site above the ghâts on the north-east line, near the junction selected for a proposed line of railway joining the north-east and south-east extensions of the Great Indian Peninsular Railway. This would secure the shortest lines to the north-west and south-east, but would necessitate some establishment being retained at Bombay for supplies destined for Guzerat or places beyond sea. As to the effect of the damp climate on the arsenal stores, the enquiries as locally made did not lead to the conclusion that the loss was severe, and the minutest enquiry would probably not induce us to recommend the removal of the arsenal on this ground.

In convenience of position for the receipt and distribution of stores, Bombay is unrivalled in India. In economy of position for the same purposes, it is unrivalled in Western India. As a base of local operations, either against Guzerat, Malwa or Central India, it is far

preferable to Poona; and, as a general base for the supply of stores to armies in and out of India, it stands pre-eminent. Unless, therefore, it be determined that it cannot be made safe against casual bombardment, I shall record my vote in its favor as the most important and valuable primary base of supplies in India.

*Minute by COLONEL A. STEWART, R. A.,  
on the comparative values of Bombay  
and Poona as the site for the main  
Arsenal of Western India.*

I.—In considering the question of the best position for an arsenal, it should be borne in mind that it does not follow, as a matter of course, that the best strategical point for assembling or concentrating a large body of troops must also, of necessity, be the most suitable one in which to concentrate our main reserves of warlike stores for eventual distribution to the army at large: and it is therefore requisite to keep these separate objects in view, when dealing with the question now before the Commission.

II.—In the case of a field force intended to operate over and control a large extent of country, which is the normal condition of the divisions and brigades of our army in India, and to which the force at Poona is no exception, such a location of the main arsenal must materially interfere with the mobility of that portion of the troops which would have to be told off for its protection, whilst the remainder took the field, and to that extent would defeat the object for which the field force had been collected.

III.—This difficulty does not present itself to the same extent, when an ordnance depôt is located at a place which must necessarily be provided with a permanent garrison, as is the case with Bombay; but, in determining the site of a main arsenal, there are many other important considerations to be remembered, of which the following, *inter alia*, have been referred to in the "Memorandum of Instructions" forwarded by the Government of India for the guidance of the Commission. I propose to deal with these in the order in which I find them most convenient; when treating of this particular question, rather than in the order of sequence laid down in our general instructions.

IV.—The more important considerations above referred to, are as follow:—

1st.—Means of communication with,  
and distance from, the primary  
source from which the arsenal is

itself supplied.—(Sub-heads *a*, *c*, and *k* of "Memorandum of Instructions.")

2nd.—The security of those communications.—(Sub-heads *a*, *c*, *k*.)

3rd.—Its own security from local attack, whether by sea or land.—(Sub-head *d*.)

4th.—The resources of the neighbourhood; principally in respect of labor, and, in a minor degree, of raw material.—(Sub-heads *h* and *i*.)

5th.—Facilities for distributing its stores, wherever they may be required.—(Sub-heads *c*, *f*, *g*, and *i*.)

V.—In the question now before the Commission, it is sought to determine which of the two sites, Poona or Bombay, best fulfils the above main requisite conditions.

VI.—Now, as regards India, England is as yet, and will, doubtless, for a considerable period continue to be, our primary source of supply of ordnance stores; next come the factories, in which war matériel is manufactured—these last obtaining their raw materials partly from England, and in part, especially as regards timber, locally.

VII.—Bombay is 119 miles of an expensive land journey, nearer than Poona to our primary source of supply, as also to the forests of Anamully and Pegu, for timber coming thence by sea; and it is, undoubtedly, the spot to which the main body of our reinforcements and most of our stores from Europe would be directed in the event of any serious disturbance in India.

VIII.—It is, of course, open to an attack from the sea, which Poona is not; but, in consideration of its position as one of the capitals of India and the seat of a separate Government, of its wealth and yearly increasing importance, of the vast commercial and other interests at stake, and of its being the terminus from which radiate so many lines of communication, both by rail and by good metalled roads, into the interior of India in every direction. *T take*



shores of Germany, illustrate what can be done towards overcoming that danger, and demonstrate the comparative weakness of an attack from the sea against properly-constructed land defences on carefully-selected sites; and I have no doubt that, with the engineering ability at the disposal of Government, the capacious and excellent harbour of Bombay can be sufficiently strongly fortified, to thoroughly fulfil these last conditions.

X.—Again, Bombay is better situated than Poona for supplying stores to the west, north-west, north, and north-east; for, were the main western arsenal formed at Poona, all stores for stations in those directions would have to be carried back towards Bombay, in addition to the prior delay and expense attendant upon sending them, in the first instance, from Bombay to Poona.

XI.—I take it for granted, that from its vastly superior mercantile transactions, Bombay possesses much more extensive and cheaper facilities than Poona for obtaining labor and raw material.

XII. In reference to strategic and military considerations, Bombay would, undoubtedly, be the last stand-point of the British army in Western India, if driven in that direction from the north-east; and an army so retreating on it would have field forces available for its aid and for protecting its flanks—on the right, from Poona and stations on the south-east line of railway; and on the left, from Ahmedabad, Mhow, &c.

XIII.—Again, in all important operations westward, across sea, the troops would be organized and equipped at, and take their departure from Bombay—*e.g.*, to Sind, Persia, Arabia, Egypt, and so on; whilst there is a sea route of only 547 miles between it and Beypore, the terminus of the main line of railway from Madras in a south-westerly direction, which line is also in communication with Bangalore, Trichinopoly, and thence back again to the eastern coast at Negapatam.

XIV.—The advantages of climate are certainly with Poona, both as regards health of employes and preservation of stores; but Bombay is not itself, by any means, an unhealthy place; and I do not attach any considerable value to the climatic differences between the two localities in respect of the second consideration.

XV.—There are already two important factories at Kirkee, in the immediate vicinity of Poona, *viz.*, the gunpowder and small

arm ammunition factories : and *pro tanto* there would be an advantage in having the main arsenal at the same place ; still, in my opinion, the other considerations in favor of Bombay brought forward in this minute outweigh this advantage on the side of Poona.

XVI.—With first class arsenals at Bombay and Madras, and a second class arsenal at Bellary, the necessity for keeping at Poona more than a first class depôt is not so apparent ; especially if there were one of these last at Belgaum, and a second class arsenal either at Nagpore, Asseerghur, or somewhere in that direction, at a somewhat similar distance.

XVII.—The subject has been so fully discussed, and by such high authorities, in the papers which have been already laid before the Commission, that but little remains to be advanced by others in reference thereto ; nevertheless, it appears to me that the maxim to which I have adverted in the first two paragraphs of this minute has scarcely been given sufficient consideration, in the various documents which treat of the comparative values of Bombay and Poona, as the site for the main arsenal of Western India.

XVIII.—After a careful review of the whole subject, not only from my own point of view, but also after attaching due weight to those arguments advanced by others, which it has been my privilege to study during the course of our enquiries ; taking also into consideration the great delay and expense which must necessarily attend an entire removal of the grand arsenal from its present site to Poona, and with the practical experience we have of the number of years which elapsed, in a somewhat similar case, between the shutting up of the gunpowder factory at Mazagon and the manufacture of the first lot of powder at Kirkee,—I must unhesitatingly record my individual vote in favor of Bombay, or of its immediate neighbourhood, as the point best suited to meet all the requirements of the case now under discussion by the Commission.

XIX.—I mention the alternative site only in the event of the course indicated in paragraphs 8 and 9 of this minute not being carried out by Government,—a contingency which, however, I do not for a moment contemplate.

ALEX. STEWART, *Col., R. A.,*  
*Member, Special Ordnance Commission.*

CALCUTTA,  
31st December 1874. }

*Minute by* COLONEL W. S. HATCH, R. A.

The advantages and disadvantages of Bombay as the site for the main arsenal in Western India may, as regards the points noted in our instructions, be briefly stated as follows :—

- (a.) Bombay is secure from attack by land, is excellent as a primary base for supplying stores to arsenals inland and to troops either stationed or engaged in either the south or north-west of India, and, being the port of embarkation for expeditions sent from India by sea in almost every direction, is the best possible base as regards any such expedition; may be made secure from attack by sea to a very considerable extent, but not entirely so.
  - (b.) Is in a good position as regards supplies to troops engaged against Hyderabad, Gwalior, Indore, Baroda, and is not liable to attack by any of them.
  - (c.) Has ample means of communication by railroad and water with almost every part of India.
  - (d.) Although the present garrison of Bombay is small and insufficient for its defence, it can be easily supplemented by troops from Poona.
  - (e.) Many buildings required for an arsenal are already available, and there is a space for increasing them to some extent.
  - (f & g.) These points must be taken into consideration when the position of other arsenals is determined.
  - (h.) Raw material of every description procurable to any extent.
  - (i.) Skilled labor available to any amount.
  - (j & k.) Most conveniently situated for both these purposes. The disadvantages of Bombay are :
    - (a.) Its liability to attack from the sea. An enemy's cruiser is now, and for years to come must be, able to run in and destroy the arsenal almost without opposition, and at but little risk to itself.
- The possibility that in the event of our even temporarily losing the command of the sea, an attack might be made by a large fleet and the arsenal be destroyed or occupied by the enemy.
- Want of space for the assembly and organisation of any large body of troops.

- (b.) Want of space in arsenal itself, and of available space in its immediate vicinity. Although the existing buildings might be supplemented to some extent, they could not be very largely added to. I doubt whether the extension practicable would be sufficient to contain stores requisite to supply stores for the increased area which Bombay will probably be called on to feed. Climate is also much against an accumulation of stores in Bombay; leather, accoutrements, harness, and, above all, rifled arms, suffer much in the hot, moist atmosphere.

The advantages and disadvantages of Poona may be detailed as follow :—

- (a.) Poona possesses almost complete immunity from attack either by land or sea, is an excellent base for all operations towards the south or south-east of India, and communication both by rail and road being available, is not unfavourably situated with reference to north and north-west.

Would probably be our rallying point were we driven back from the north-west, threatens the flank of any force advancing on Bombay from that direction, and in the possible, though hardly probable, event of our losing Bombay by an attack from the sea, would prevent any attempt to advance either towards north-west or south. Climate excellent both for troops and preservation of stores.

- (b.) Is more conveniently situated than Bombay with reference to Hyderabad, but less so with reference to other places named.
- (c.) On line of rail and of main road to Southern India; can communicate both by rail and road with north-west but not directly.
- (d.) Is the station for a large body of troops, and is a convenient point on which troops either from England or the south of India could be assembled and organised.
- (e.) New buildings required. Ample space available for them.
- (f & g.) As with Bombay.
- (h.) Supplies of all sorts procurable, but at rather higher rates for timber and English stores than in Bombay.
- (i.) Nearly as great as in Bombay.

(j.) Factories being already at Poona, the cost of supplying troops would be on the average much the same.

(k.) Dearer than Bombay, being 120 miles inland.

Summing up the comparative advantages and disadvantages of Bombay and Poona as sites for the main arsenal in Western India, it appears—

(a.) That as regards security from attack, Poona is far superior, but, as a base of operations, is, to a certain extent, inferior to Bombay.

(b.) The two places are about equal, the advantage slightly in favour of Bombay.

(c.) Bombay preferable.

(d.) Poona has the advantage.

(e.) Bombay, better to a considerable extent.

(h, i, j & k.) Bombay superior.

Were any position less liable to attack than that now occupied by the arsenal available in or near Bombay, I would without hesitation recommend the removal of the arsenal to it; but I know of none.

The junction of the two branches of the Great Indian Peninsula Railway at Callian is doubtless an important strategic point; but it has the disadvantage of an unhealthy situation, and from its low position its climate would be almost as hurtful as that of Bombay to arms and accoutrements. A position near Egutpoora would afford many advantages as regards supply of a force operating in the north-west, and would be free from objections as to climate, but would be disadvantageous for the supply of Southern India; and the selection of a site in this direction would necessitate the erection of barracks involving a large expenditure of money and a larger dispersion of troops than at present, as it cannot be disputed that wherever the arsenal may be, Poona must be strongly held. This last consideration also militates against Lanowlie.

The more I consider the subject, the more I am convinced that, even when the proposed harbour defences of Bombay have been completed, the destruction of an arsenal, where the present Bombay arsenal now is, will be within the power of an enterprising enemy, and that the prospect of not only destroying a vast amount of our most important military stores, but of levying a heavy contribution from a very wealthy city, will be sufficient to induce such an enemy to incur whatever risk may be involved in the proceedings. I therefore consider the present site of the Bombay arsenal

absolutely unsuitable, and, in the absence of other sites nearer the coast that would meet the requirements of the case, still strongly advocate the location of the main arsenal for Western India at Kirkee or Poona.

W. S. II.

*Memorandum on relative importance of Bombay and Poona as the site of the main Arsenal for Western India.*

It seems proper, in the first place, to state shortly the objections raised against the maintenance at Bombay of the grand arsenal at present located there. These are, *firstly*, in the words of His Excellency Lord Napier of Magdāla :

“The main object to be obtained is the removal of the grand arsenal, containing the military resources of Bombay, to a secure place inland from the coast, where, owing to the levelling effects of steam, the improvement of artillery, and the growth of foreign maritime powers, they have become less safe than formerly from hostile attacks by sea.”

*Secondly*, as urged by the several authorities of the Ordnance Department, the baneful effects of the exceedingly damp climate are very detrimental to certain classes of stores and occasion great losses, which would be avoided by removal.

There are, *thirdly*, objections on the score of want of accommodation in store houses, their want of ventilation and consequent unfitness, and the limited area of ground available with the arsenal, occasioning inconvenience.

The first objection is the most important, and needs the most careful consideration. It must be regarded from two points of view: the one, the possibility of attack by sea, in force, by a large fleet transporting troops for the invasion of India; the other, the sudden appearance in the harbour of one or more heavily armed armour-plated cruisers, threatening the city, with the view of exacting contributions.

The first of these contingencies I have never yet heard spoken of as coming within the range of possibility; it implies such national decadence of Great Britain and absolute loss of her maritime supremacy as no Englishman at the present time can seriously contemplate, and which cannot be discussed in connection with the question before the Commission.

With other purpose than that of invasion with the view to conquest, the approach of a hostile fleet with troops would

be perfectly useless, because a single cruiser, or a couple, having the power to enter the harbour, would as effectually place Bombay under contributions; and this latter is a contingency admitted to be not only possible, but to come within the range of the not altogether improbable. At all events, it is so possible a contingency, that it is undoubtedly felt that measures ought to be taken to protect the harbour, which can be done by adequate fortifications, against its occurrence. When considering the question, the Commission has therefore the right to expect that the Government, in view of the enormous interests at stake, will undertake such military works for the protection of Bombay as will render an enterprise of the kind hopeless. Great as is the power derived from steam, it belongs to both parties equally: and from the improvements of artillery, the advantages, if to either side, should rather be on that of land batteries, backed as they would be by turret-ships, torpedoes, and other resources of defence.

As Bombay can be rendered secure, and it must be concluded that it will be, it remains for consideration whether on other accounts it is unsuited to be the site of the main arsenal of Western India. In favour of it, it must be allowed that, geographically, it is a most important position; it is the nearest point to England, and, consequently, the road or gate by which all reinforcements of men, arms, and great proportion of the munitions of war, come into India; and if the thought of the English being driven out of India ought to be alluded to—as possible a contingency, however, as its invasion by a foreign enemy coming by sea—it would be the place of Central and Western India held to the very last. Being at the capital there must always be a garrison on the spot for protection of an arsenal; it is the point upon which all the lines of railway to the north, north-east, east and south, converge; and is, further, the place of embarkation for all expeditions by sea to Sind, Beloochistan, the Persian Gulf, the Red Sea, Africa, China—to wherever, hitherto, there have been military operations beyond sea; and as it must be, (and probably on far larger scale,) in the future, when the great questions concerning Eastern Europe and Russian advances in Asia come to be decided. It is impossible to overstate the importance of Bombay in this respect; it has the best harbour in India; it is the centre of, perhaps, the largest and a still growing commerce, and maintains

interests of the greatest magnitude that never can be neglected, and thus forms a natural strategic base for all military operations within and without India, as long as England maintains her power at sea: there are also greater facilities for supply of material and labor at the capital, than at any other place in the western presidency, which is a consideration of great value in deciding the position of an arsenal. The more carefully the objects it may serve are enquired into, the higher will Bombay rise in importance as an essential military centre, showing that the measures necessary to be taken are not the removal of the arsenal, but such steps as will render the position secure against all *probable* danger, especially from the sea, whence at present it is most vulnerable.

The *second* class of objections refers to climate, which, it has been strongly urged, owing to dampness arising from proximity to the sea and heavy rain-fall, is injurious to arms, leather accoutrements, harness, and stores made of perishable material. On this point there have been statements put forward, showing the actual losses incurred which support the recommendations for removal of the stores to Poona; but deteriorations arise also from too prolonged storage and insufficient or injudicious supervision in arsenals all over the country. In Fort William stores suffer from damp, and at Ferozepore from excessive dryness; and these losses, if they cannot be entirely prevented, can certainly be greatly limited by better departmental regulations. When inspecting the store-rooms, I observed that there was nothing to object to in the appearance of the harness, &c., and the warrant officer in charge stated that no excessive deterioration occurred, if the stock was properly looked after and all mildew carefully wiped off. The Commissary of Ordnance stated that Kurrachee was a much worse climate; and that no large quantities were kept in store, as harness, &c., were made up as required. The Chief Civil Master Armourer stated that there might possibly be deterioration among the arms to the extent of an one-sixteenth per cent., meaning a very trifling loss; and he did not dwell upon any particular difficulty in their preservation. The evidence given by the Inspector-General of Ordnance, at page 148 of the Minute is in general terms; and in that of commanding officers there are no complaints about leathern accoutrements or harness having deteriorated before issue, or not lasting fairly, except in one instance at Mhow, by the Officer Commanding Battery, Royal



Horse Artillery, who stated that the thread was rotten and the sewing bad in consequence; the harness however had, it was believed, been six or eight years in store before issue, too long a period for such perishable material to be kept in any arsenal in India.

The further objections against the present arsenal relate to the insufficiency of storage accommodation, the defective ventilation of some of the store-rooms, and the insufficient working space. On these points the Commission, after having inspected the dockyard, in their Minutes Nos. 73 and 76, came to the general conclusion that there is ample space for the purposes of a first class arsenal. This seems possible by re-arrangement of some of the store-rooms and better utilisation of space in them; by opening out and improving the ventilation of some; adding upper stories where practicable; by building an upper-storied store-room on the site of the existing dilapidated and proposed buildings (V and Q in the plan); and further, if necessary, replacing the warrant officer's quarters by a new range of store-rooms, accommodation being provided for the men in some more suitable and airy locality. Also, there exists in the dockyard store accommodation and ground far exceeding its present requirements, which might afford storage room for the whole of the stores, guns and carriages belonging to the naval reserves and harbour defences, and there would probably be no difficulty in portioning off and allotting a portion for use of the Ordnance Department. In such manner it is believed that very good and suitable accommodation for the stores, and convenient working of a large arsenal, might be secured.

It is, however, essential that the whole of the arsenal outside the castle should be enclosed by a high, strong, continuous wall, with a good, strong gateway, affording complete protection against any sudden tumultuary rising of the populace.

There would seem, therefore, no difficulty in giving effect to the decision of the Government of India, acquiesced in by the Government of Bombay, that the establishment to be maintained at Poona shall be of the nature of an ordnance dépôt only.

Though giving the above views as properly leading to the conclusion that the arsenal ought not to be removed from Bombay, it is not intended to say that its present site is unobjectionable. On the contrary, were an arsenal to be estab-

lished there *de novo*, that particular locality would not be selected, because its position, immediately on the seaboard and in a cramped space, surrounded by buildings which overlook it, is undoubtedly bad. The consideration of what is needful and proper must, however, necessarily be influenced by existing circumstances, and the question dealt with not in the abstract, but in view of what will be most conducive to the interests of the public service, provided that the principles of security and efficiency be fully maintained; and as regards the fulfilment of the latter, the means at command are sufficiently suitable, but the safety depends upon the measures taken for defence of the harbour against the not improbable visit of an armed cruiser, and it is incredible that with the enormous interests at stake, the construction of the necessary defensive works will not be proceeded with; but even should Government not see proper to take such steps, the importance of Bombay as the principal strategic base and proper site for the main arsenal of Western India will still, though not in the same perfection, remain, and the necessity would arise for the erection, in lieu of the harbour defences, of a fort out of range of the guns of hostile vessels, which would protect the arsenals and seat of Government, and maintain an absolute command over all the lines of communication. Whatever the circumstances that may happen, the security of Bombay is necessary to our military position in India, and no enemy coming there could be allowed to gain possession of the plains below the ghâts and command the resources of the rich provinces of the Concan, Khandeish, Guzerat, and the line leading direct into Hindoostan, and into the countries of independent chiefs most likely and most able to afford assistance.

F. TURNER.

2nd January 1875.

*Memorandum by Secretary.*

In discussing the strategical values of Bombay and Poona, the following points might be considered:

1. So long as Poona was held, an invading army, driving our forces back towards Bombay, could hardly attack the latter place, as his communications could be cut perpendicularly.

2. He must either mask Poona or attack it.

3. In either case, his endeavour would probably be to gain the road, and Great Indian Peninsula Railway by the line Malligaum, Munmar, Ahmednuggur, Dhoond, and close the line of retreat towards Southern India.

4. Our object would be to gain time and exhaust our enemy, who would have a difficult task to maintain his greatly extended communications.

5. The British commander would then have to choose whether he would retreat towards Southern India by this line, or stand and fight; if this line of rail and road were lost to him, his only chance of safety would be in a retreat towards Belgaum.

6. It will be seen, therefore, that the protection of Bombay is afforded by the position of Poona situated eccentrically to the main line; moreover upon this position would be gathered such resources as Southern India might possess.

7. If, however, we assume that our forces pushed back from the north-west towards Bombay are unable to do anything towards keeping a last hold of Southern India, then Poona loses in value and Bombay gains, the latter point would be the place of embarkation.

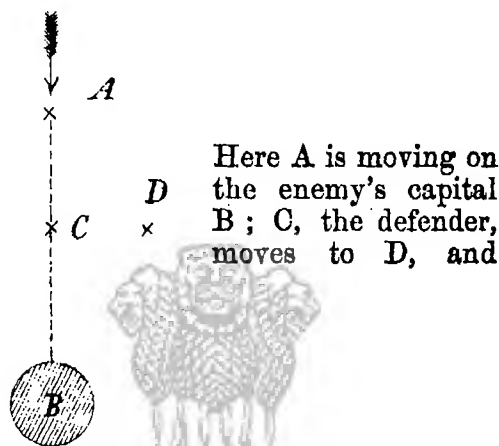
8. Under this supposition Bombay being our last point of retreat, Deolalce, Nassick, would probably be occupied, as Poona would be off the line of retreat, unless we were strong enough to force an enemy to attack it.

9. An example of what is meant by the position of Poona eccentric to the lines Bhosawul, Bombay or Malligaum, Bombay may be found in the war of 1870 and 1871 and the position of Orleans and Le Mans. It is well known that, owing to the power France was collecting there, the fate of Paris at one time trembled in the balance, and that the Prussian headquarters were more than anxious for their communication with their base; every effort was made to crush the enemy gathering in the south, the greater part of the army besieging Metz being hurried off under Frederick Charles twenty-four hours after the fall of that city. It is held by many that, had Metz stood out a little longer, the army of Orleans would have raised the siege of Paris; while even later in December and January 1871, had Bourbaki marched towards the Prussian line of communication instead of towards Belfort, the raising of the siege of Paris

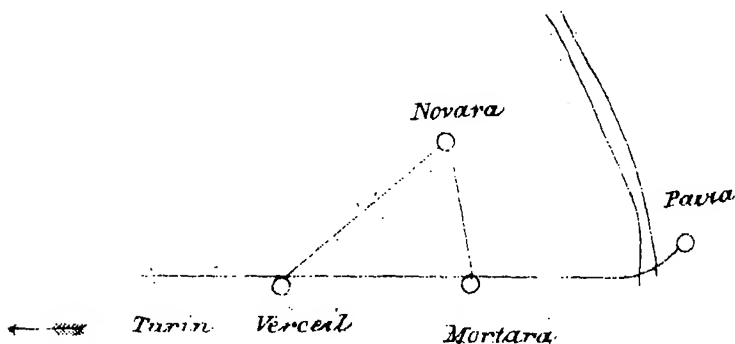
might have resulted, or at all events have allowed the French to gain time for fresh combinations.

In these examples the invader had such a preponderance of troops that he was able—but only just able—to crush the opposing forces threatening his line, and at the same time carry out the operations against his objective—Paris.

But other and more striking illustrations might be given of the defensive value of a position off the main line of attack or retreat, as shown in the diagram:—



the position D possesses such "attractive" power that A must attack D before he advances to B. And provided the defender has a line of retreat from D, he has by this movement placed A in an inferior strategical position. For, when he advances on D, his communications are no longer perpendicular to his front of battle.



In 1849, seventy-thousand Austrians moved towards Turin from Pavia by Mortara and Vercell. The Sardinians concentrated at Novara, and obliged the Austrian Commander Radetsky to move towards that place. In considering this subject, Willisen, one of the great German authorities on the art of war, holds that a Prussian commander resisting a successful

French attack at Coblenz would be perfectly right to retire lower down the Rhine to Cologne.

10. It may also be remarked that our base of operations would probably be neither Bombay nor Poona simply, but *both*. A base may be a great line of frontier, and is not merely a single point in a country. If we hold the line Nassik, Jooneer, Poona, and were based on Bombay, Poona, we should probably retard the enemy's advance on the left, while we gathered up reinforcements from the south on our right, and descending on his line of communication, force him to form front parallel to that line of communication, and thus place him in the worst possible position for either success or defeat.

11. At Poona the reserves would be safe, both from the outside and from insurrectionary attack; and the ground at Kirkee is peculiarly adapted for defensive purposes.

12. The value of Poona (possessing all the advantages which attach to good climate, water, and space for the encampment of a large army) as a position for organizing and forwarding an army, is very great. It would probably be chosen either for inland service, or for an expedition beyond sea, in preference to Deolalee.

The latter is the more convenient as to rail; while on the other hand Poona has much greater natural and artificial advantages.

13. There are greater facilities for collecting and housing stores of all kinds at Poona than at Deolalee. Both are connected by rail and metalled roads with Bombay.

14. It may also be said that Deolalee would be a dangerous position for a defender to place himself at with his back against the mountains; if defeated, he would be driven down the pass Thull Ghât, and his only escape would be by the sea: the operation of embarking an army in the face of an enemy pressing hard being at all times one of great difficulty.

15. There is also another point to be considered, that the main reserves, if absolutely on the frontier at Bombay, offer great temptations to an enemy to attack the position.

16. If the troops wanted for the north-west or inland service are to be pushed to some point farther on unorganized, neither Deolalee nor Poona would have any particular value for that purpose.

17. Lastly, if troops cannot be massed in or near Bombay, its separate value as a base of operation can hardly be accepted.

After the foregoing minutes were read, the President took the votes of the Commission, which were recorded as follows:—

Lieutenant-Colonel Macgregor voted against Bombay absolutely.

Mr. Haliburton voted for Bombay.

Colonel Stewart voted for Bombay.

Colonel Hatch voted against Bombay.

Major-General Turner voted for Bombay.

The following resolution, conveying the conclusion of the Commission on the subject, was therefore recorded:—

Colonel Hatch and Lieutenant-Colonel Macgregor entering their protest, and referring for reasons to their minutes.

“The Commission having fully discussed the question of the best site in Western India, as a base of supply of warlike stores to arsenals, depôts, garrisons, and armies in India, and each member having placed his views on the subject in writing on the record of the minutes of the proceedings, consider that as Bombay is safe from any probable attack by land and can be rendered practically secure from attack from the sea, and as it possesses unrivalled means of communication by land and sea with the principal quarters of the east in which Indian armies are likely to operate, it is the most valuable site and the proper primary base of supplies in Western India.

If the arsenal were to be constructed *de novo*, the Commission would not recommend the exact site it occupies, but would have selected some other in the immediate neighbourhood of Bombay; in view, however, of the great delay and expense which would be incurred for its removal and re-establishment elsewhere, the Commission are not prepared to recommend that course being adopted.”

#### FORT WILLIAM.

*For details see appendix.*

I would propose to amplify this in the appendix on such points as “buildings and works,” or those with reference to which the Commission may desire to make recommendation when they are considering the details of the Fort William arsenal.

E. C.

The following proposed rough draft of portion of report relating to Fort William arsenal was laid before the Commission by the Secretary, approved and ordered to be recorded.

“This should be maintained as a first class arsenal.

Calcutta is a primary base of operations in Eastern India. It is a large commercial centre and the capital of Bengal. The construction of powerful batteries in the Hooghly and the Mutlah will add to

the natural advantages of safty Calcutta now possesses, and will render it secure from an external enemy.

In Lower Bengal no native state exists which possesses any warlike strength, and the arsenal is securely placed for operations against Burmah, the East and North-East Frontier, and Nepaul.

The fortress in which the arsenal stands can be made practically impregnable against local or insurrectionary attack by the substitution of a few rifled guns for part of the present S. B. armament, and it is presumed that Calcutta and its neighbourhood will always be occupied by a British garrison.

Calcutta is the great port of Eastern India, and from which radiate lines of communication by railroad and water to all parts of the empire. Calcutta and the neighbouring country possess great resources in material and labor; the arsenal is well situated to meet the demands for the troops and establishments dependent; the port of Calcutta attracts large quantities of shipping from England, and places the arsenal in the first rank as an economical and convenient source of supply for Eastern India."

The Commission adjourned at 4 P. M. until Wednesday, the 6th instant, at 11 A.M., when it was decided to take up the question of the arsenal for Sind.

सत्यमेव जयते

*Minute No. 114, dated 6th Jan. 1875.*

The Commission met at 11 A.M. Minute 113 was read and confirmed.

In accordance with the decision in that Minute, the Commission renewed the discussion on the number and position of the arsenals, &c., for India, and took up the question of the arsenal required for Sind.

#### SIND.

After discussion they recorded the following resolution :—

“ All the authorities concur in stating the importance that belongs to Sind, as connected with the north-west frontier of India, in the event of the occurrence of hostilities of either an offensive or defensive character; and the necessity for an arsenal in some position is generally maintained.

Three places present themselves—Sukkur, Hyderabad, or Kurrachee.

The first, *Sukkur*, is undoubtedly a place of importance, being on the Indus, at a point where the railway crosses the river. As it can be supplied from either end of the line—if from Ferozepore by the left and safe side of the river—it would necessarily from its position become a field depôt for the collection of cattle and stores during a campaign; but as there are very few troops in time of peace to be supplied, there is no occasion for a permanent ordnance establishment there.

2nd.—The present arsenal in Sind is in the Fort *Hyderabad*, which is 4 miles from the left bank of the Indus. The buildings are suitable and commodious, and the position is a safe one, which is a consideration of value; on the other hand the objections are that, on the left bank, it is on the wrong side of the river for convenience and economy of supply, and that as the main force to be supplied is at Kurrachee, a double and unnecessary cost of transport is incurred. It is further objected, that the location of the arsenal at Hyderabad necessitates the maintenance of European troops at the station for its protection, and at certain seasons of the year, after the rains, the fort often proves very unhealthy, so much so as to render the removal of the Europeans and Natives to the cantonment, and other places near at hand, advisable.

3rd.—*Kurrachee* is the capital of the province, and will always need a garrison for its protection; it is the port through which all military stores are entered, and its position is the natural base of military operations of troops employed in the defence of the province, for attack on



neighbouring states, and for the troops that would necessarily be assembled for co-operation with the main armies that may be employed on the North-West Frontier. The location of the arsenal at Hyderabad has hitherto occasioned the maintenance of an ordnance depôt subsidiary to it at Kurrachee, the buildings of which latter can be sufficiently extended or increased so as to provide for the requirements of the province; the position is out of reach from the sea, and can be made secure against any tumultuary outbreaks, and affords at the same time a place of refuge. This would provide for ordnance requirements at a small cost in the interim, until the far larger and more important question of a fortified work for the protection of the place be determined and constructed.

So much must be said *pro* and *con* the three positions named; and if an arsenal must be retained in Sind, Kurrachee is the proper place for it: but the subject to be dealt with is the efficient supply of the troops in the province, and the maintenance of such reserves of warlike stores as shall meet the requirements of the service at breaking out of hostilities; and with regard to these points it must be stated that there is no large number of troops to be ordinarily supplied, and that no difficulty whatever need be anticipated, if what they want were obtained from the grand arsenal, Bombay, which is only three days distant by steamer, and the communication with which is regularly twice a week. Nothing detrimental to efficiency could result from so short delay in forwarding stores, such and longer occurs frequently, and, under ordinary circumstances, is of no consequence whatever.

From these points of view the Commission conclude that a first class ordnance depôt for the deposit of reserves of ammunition of all the troops in Sind, and, in addition, such siege train and stores as the possible nature of the services to be anticipated in these parts may render necessary, is all that is required. Political reasons may, however, be found to exist that make it advisable to give a more extensive allotment of stores, such as arms and accoutrements, to this particular depôt, necessitating a larger supervising establishment, which might be nearly equal to the duties of a second class arsenal; and it is therefore advisable to consider this question further in connection with the pressure which the possible reduction of other ordnance establishments will throw upon the grand arsenal at Bombay."

The Commission proceeded to discuss the question of the arsenal, Fort St. George, and removal from its present site. Abstract of opinions, &c., chiefly gathered from papers furnished to the Commission, was laid before the Commission by the Secretary and read.

Ordered that this and the papers be handed over to Colonel Stewart, for transference, after perusal, to Colonel Macgregor and to the President in succession.

Adjourned until 11 A. M. on Saturday, the 9th instant, when the Commission agreed to resume the discussion on the arsenal of Fort St. George and its proposed removal.



The Commission met at 11 A.M. Minute *Minute No. 115, dated 9th Jan. 1875* 114 was read and confirmed.

The discussion on the proposed removal of the grand arsenal from Fort St. George was continued.

The Commission adjourned at 4 P.M. until 11th January 1875.



सत्यमेव जयते

*Minute No. 116, dated 11th Jan. 1875.*

The Commission met at 11 A.M. Minute 115 was read and confirmed.

The discussion on the removal of the arsenal from Fort St. George was renewed, and after discussion the following resolution was framed :—

“ The Commission having thus fixed the situation of the primary bases of supply for Northern, Western, and Eastern India, proceed to determine, on the principle laid down, the best site for the main arsenal of Southern India.

\* A small harbour has been proposed.

The position of Madras is not naturally a strategical point; there is no harbour,\* and the coast is, at present, peculiarly unfitted for the landing or embarkation of troops and stores. But Madras is the seat of Government, and the chief city and stronghold of the Presidency. From it railway communications lead to Bombay, to Bepore on the Western Coast, and to Southern India *via* Trichinopoly. The position of Madras on the seaboard also fulfils the conditions the Commission have insisted on in paragraph as necessary for a primary base of supply in India.

The present site of the arsenal in Fort St. George possesses all the advantages stated above, and is practically secure from insurrectionary attack. The fort is, however, in a ruinous condition, and can only be repaired at an enormous expense, and even then the arsenal would be liable to be shelled by any heavily-armed steamer which might approach it; whilst, owing to the configuration of the shore, no possible combination of batteries could entirely prevent such a contingency.

For these reasons the Commission advise the removal of the arsenal into a position of greater safety.

The Government of Madras have caused a careful examination to be made of the sites available. Those at the Adyaar and Arconum may be rejected.† The sites remaining are Avady and St. Thomas' Mount; the position of Avady on the main railway, and only 13 miles from Madras, possesses many of the qualities essential to an arsenal site.

† See précis in Appendix F, heading Arsenal, Fort St. George.

The ground is open, the soil good, water-supply (it is stated) sufficient, and the position has great defensive capabilities. Avady is within a few miles of the British cantonments of St. Thomas' Mount and of Poonamallee. On the other hand, there are no buildings of any sort at Avady; the establishment of a fortified arsenal and

cantonment would involve a very heavy immediate outlay, and would necessitate the further dispersion of our troops. If Government be prepared to incur this large expenditure, the Commission would regard this as the best site for an arsenal. In the opinion of the Commission, however, the financial and other objections outweigh the advantages of this site, and make it desirable to fix upon some position which shall, as nearly as possible, fulfil the conditions of the problem without entailing so great an expenditure.

In the opinion of the Commission, the position which most nearly meets the requirements of the case is the site of the ordnance depôt and ground adjacent, as marked in plan at St. Thomas' Mount. At that place there already exist a British cantonment, ample public buildings of various kinds—a large powder magazine has been lately built at a cost of £4,600, to hold the powder and ammunition reserves of Southern India—and an ordnance establishment with ground and buildings immediately adjacent, also belonging to Government and capable of being turned into an arsenal. St. Thomas' Mount possesses bazars for the accommodation of workmen and labourers; it is near Madras as to command all the advantages of the city for the supply of labor and material, and is close to the new lines of the Carnatic Railway, which will connect South-Eastern India with the whole railway system.\*

\* See Appendix.

The only disadvantages which this site possesses are—

1st.—That the Mount is not in itself capable of defence against a regular siege conducted by a European enemy.

2nd.—That the proposed site (see plan) is in the middle of a cantonment.

It remains therefore to consider whether these disadvantages are sufficiently grave to oblige the Commission to recommend the retention of the arsenal in its present exposed position.

The Commission would remark that in their opinion no great weight should attach to the first objection.

The highest military authority in India, Lord Napier of Magdāla, has indeed pointed out the insuperable objections to the site which was chosen on the Palaveram plain for a large entrenched camp to hold the arsenal and ordnance factories. That position is commanded both

from the hills of that name and from the Mount, and no argument as to convenience of situation could outweigh the serious military evils connected with it; these evils do not exist in the position now chosen for an arsenal only.

The Palaveram Hills are distant 4,500 yards, while the Mount, if properly fortified by a simple entrenchment and batteries, would form a strong position to resist an insurrectionary movement or even a *coup de main* attack by regular forces.

By clearing away some of the buildings in the immediate vicinity of the site pointed out, and surrounding the arsenal by a defensive work of an inexpensive character, we should sufficiently provide against an insurrectionary attack.

The fact that many of these buildings are Government property, and all situated on Government ground, render the proposed measure comparatively easy and inexpensive.

The defensive work would provide for immediate safety, and the gradual acquirement of the adjacent houses, and their demolition, would increase the security to such an extent, as would remove the only real objection to the site selected.

The Commission therefore recommend the removal of the arsenal from Fort St. George to the position at St. Thomas' Mount marked on the annexed plan, and the occupation of the ground as detailed in Appendix F, heading Fort St. George.

On its being put to the vote, whether the draft resolution now framed, recommending the removal of the arsenal at Fort St. George and its location at St. Thomas' Mount, should be adopted, the following was recorded:—

Lieutenant-Colonel Macgreger voted against its location at St. Thomas' Mount, and proposed the following amendment:

“That the arsenal be moved from Fort St. George, that the Adyaar and St. Thomas' Mount sites be finally rejected, and that the question of the actual site be left for such further consideration as Government may direct.”

On the amendment being put to the vote—

Mr. Haliburton voted against the amendment.

Colonel Stewart voted against the amendment.

Colonel Hatch voted against the amendment.

Major-General Turner voted against the amendment.

On the original motion being put to the vote.—

Lieutenant-Colonel Macgregor voted against it.

Mr. Haliburton voted for the resolution.

Colonel Stewart voted for the resolution.

Colonel Hatch voted for the resolution.

Major-General Turner voted for the resolution, which was consequently carried and ordered to be entered in the record.

In connection with the foregoing, it was decided to despatch a telegram to the Secretary to Government, Military Department, Madras, asking when the estimates for Avady would be ready. Also, to ask the Secretary to Government, Public Works Department, Madras, for the cost of buying up and demolishing the houses within the space marked in red on the plan.

The Commission then proceeded to discuss the number and position of the arsenals of the north-west.

#### RAWAL PINDI AND PESHAWUR.

The following resolution was proposed and adopted:—

“In the opinion of the Commission there should be a second class arsenal at Rawul Pindi, and a second class depôt at Peshawur.”

The positions of the depôt at Dera Ismail Khan and Mooltan were discussed, and the views of the president and members on the subject of the retention or otherwise of the Dera Ismail Khan depôt having been expressed in writing, they were handed to the Secretary for the purpose of framing a resolution to be brought before Commission at the following meeting adjourned 4-30 P. M.

*Minute No. 117, dated 12th Jan. 1875.*

The Commission met at 12 noon.

Minute No. 116 of 11th January 1875 was read and confirmed. The Commission adopted the following resolution with regard to the ordnance depôt at Dera Ismail Khan :—

**DERA ISMAIL KHAN.**

“The ordnance depôt at Dera Ismail Khan is situated in a fort on the right bank of the Indus, and only 33 miles from the frontier.

It supplies the troops in the station, and at Bunnoo, with ammunition.

This force consists of—

Two Field Batteries, Punjab Field, Force.

One Company British Infantry.

Two Native Cavalry Regiments.

Four Native Infantry Regiments.

These troops are in possession of, or should have their full service complement of ammunition per man and camp equipment, and be perfectly equipped to take the field in any minor operation for which their services might suddenly be required. For operations of a greater magnitude the stores now in deposit would not be sufficient. In such an event there would be ample time to forward reserve stores, &c.; while in time of peace ammunition can quite as efficiently be supplied to Dera Ismail Khan, and Bunnoo, from either Mooltan or Rawul Pindee.

In the opinion of the Commission the dangerous proximity to the frontier demonstrates the badness of the position for a depôt in a military point of view, while it is shewn that it is not needed for purposes of supply.

The Commission therefore consider the Dera Ismail Khan depôt should be abolished.”

The following resolution was adopted regarding

**MOOLTAN.**

“Mooltan is a prominent strategical point. It is near the confluence of the great rivers of the Punjab. It is in water communication with the sea. It is connected by rail with Lahore and the southern and eastern system of railways, and the Indus Valley Railway will unite it to Sind and the capital Kurrachee. It has road communication with Lahore and also with the frontier stations.

Mooltan is the centre of the frontier, and is the place at which many of the routes from beyond our frontier concentrate.



Mooltan would, it is evident, play an important part in any operations for the defence of the frontier, but its position is too far forward and exposed for a main arsenal.

This view has been taken by the Government of India, and the question of increasing Mooltan to the rank of an arsenal may be considered as finally and negatively settled.

In the opinion of the Commission, Mooltan should have a first class ordnance depôt."

#### FEROZEPORE.

The Commission proceeded to discuss the position of the arsenal at *Ferozepore*. It was resolved to postpone further discussion on this head until information regarding the cost of the arsenal and the works, and the annual cost of the transport of stores to and from Ferozepore, had been ascertained.

#### BAREILLY.

The Commission discussed the necessity or otherwise for the retention of the ordnance depôt at Bareilly, and adopted the following resolution :—

"The Commission are of opinion that the retention of the ordnance depôt at Bareilly is unnecessary, as there are now two separate lines of railway communication through the Oude and Rohilcund Districts—one from Allahabad *via* Lucknow and Shahjehanpore, the other from Agra *via* Allyghur and Chandowsie; by which lines troops at Bareilly, Shahjehanpore, Rancekhet, and other stations, can be efficiently supplied from either Allahabad or Agra, according to their position.

By present arrangements, stores for Bareilly are sent from Agra, for eventual distribution throughout the district, and have occasionally to travel twice over the same ground."

After discussing the position of Agra and Allahabad, the Commission recorded the following resolution :—

#### AGRA.

"That the ordnance establishment at Agra should continue a first class ordnance depôt, retaining its capability for conversion into an arsenal should the necessity be experienced hereafter."

#### ALLAHABAD.

"The position of Allahabad at the junction of the Ganges and Jumna rivers, and of the railway system, communicating with the Punjab, Western and East-

ern India, is of the utmost importance as a secondary base of military operations necessitating the retention there of a first class arsenal."

#### NEEMUCH.

After discussion the following resolution was adopted :—

"The station of Neemuch is about midway between Nusseerabad and Mhow; the former place is connected by rail with Agra, and will be, it is understood, in course of time with Deesa and the line to Bombay. Mhow will be in communication with Bombay by rail as soon as the bridge over the Nerbudda is completed, and the line is in course of extension from Mhow towards Neemuch as far as 60 miles distant.

The ordnance establishment at Neemuch supplies only the troops located there, and, except during the four months of the monsoon, when the movement of troops is exceedingly difficult, has practicable communication with Mhow and Nusseerabad; there exists, therefore, no difficulty of consequence in the transport of supplies, and there are no native powers in the immediate neighbourhood of sufficient power to render it probable that the force at Neemuch would require more than its full service complement of ammunition and stores with which to take the field. The Commission therefore are of opinion that an ordnance establishment is not necessary at Neemuch."

The Commission discussed the question of the retention, or otherwise, of Saugor and Mhow, and the establishment of an arsenal on the line of railway between Allahabad and Bombay.

Adjourned 4 P. M.

The Commission met at 12 noon.

*Minute No. 118, dated 13th Jan. 1875.*

Minute 117 was read and confirmed.

The Secretary explained the steps that had been taken in regard to the preparation of the map, and it was decided to have the present map showing circles of supply cleared of the names not wanted, and this to be map No. 1 showing present arrangements.

Map No. 2, a similar map without circles of supply, and to represent proposed arrangements.

The Commission discussed the question of the retention of the ordnance establishments at Saugor, and Mhow, and Nagpore. They further discussed the question of placing an arsenal at Khundwah, Asseerghur, or Bhosawal, and the abolition of the ordnance establishment at Mhow and Nagpore. It was resolved to ask the Government of India to direct Colonel Crommelin, C. B., R. E., now on tour, to inspect Khundwah and report whether, in a military point of view, there is a site there for a second class arsenal. Also, that the discussion be adjourned till the 14th instant, at 12 noon.



*Minute No. 119, dated 14th Jan. 1875.*

The Commission met at 12 noon.

Minute No. 118 of 13th January 1875 was read and confirmed.

The Secretary brought to notice that he had engaged a second clerk, and proposed that as his services are above those rendered by a mere copyist, he should receive Rs. 80 per mensem. This was agreed to by the Commission.

Letter to Secretary to Controller, Public Works Department, No. 12, dated 14th January 1875, asking that Colonel Crommelin might be requested to inspect the position of Khundwah and give his opinion on it as a site for an arsenal in a military and engineering point of view, read and approved.

The Commission continued the discussion regarding the abolition of Saugor depôt, Mhow arsenal, and Nagpore magazine, and the establishment of an arsenal at some point on the Great Indian Peninsula Railway.

The following Minutes were read and ordered to be recorded :—

*Memo. by the President on the subject of an Ordnance Establishment for Central India.*

The Commission have discussed the feasibility of abandoning the ordnance establishment at Mhow and Saugor, the reduction of the magazine at Nagpore to the condition of a depôt, and the formation of a second class arsenal at some position on the Great Indian Peninsula line of railway in the neighbourhood of or between Bhosawul and Khundwah junction, and three sites have been suggested at the two places named and Asseerghur. With regard to them, it may be observed first as to Asseerghur: it is a very strong, natural position, having extensive defensive works, and buildings sufficient for the accommodation of a small garrison already existing, and, if there be space for the building of an arsenal within the works, would be suitable as far as security is concerned. It was a most important stronghold in the hands of native powers, and so far is a place of historical repute; but it does not, owing to its position, retain its importance, now that the country is in British possession and the lines of communication are out of its immediate reach. The position itself is not suitable for an arsenal, being 7 miles distant from the rail and on the top of a lofty hill, accessible only by a long, circuitous, and difficult road. Asseerghur itself is not a

centre of any commercial activity, nor does its neighbourhood furnish either the material, or a supply of labor, for the purposes of war, and is not a suitable position therefore for an arsenal, nor except for the protection its works might temporarily afford to beaten or retreating troops, is it calculated to become a *point d'appui* of any great value for military operations.

Bhosawul being at the junction of the lines of the Great Indian Peninsula Railway, leading respectively to the Central Provinces and to the north-west of India, is of value in this respect in connection with the supply of stores to troops stationed or operating in the Central Provinces; but it is of no special importance in this respect, as there would be no difficulty in sending dispatches through from Bombay.

Khundwah, as the junction of the Great Indian Peninsula Railway and Malwa State Railway, is of greater importance from an ordnance point of view, because there is a break of gauge; and an arsenal at that spot would facilitate to that extent the dispatch of stores in eastern direction. An arsenal there could also supply ordnance stores to the Central Provinces, if it became necessary owing to pressure of work on the Bombay arsenal, at an additional cost of 4 annas a ton a mile over the double distance, and stores would be conveyed between Bhosawul and Khundwah, or for the 160 miles at Rs. 40 per ton; say for 50 tons would be Rs. 2,000 per annum. This is rather a full estimate as ammunition, and the most bulky stores would be supplied from the factories from Bombay. Khundwah is central between Jubbulpore and Bombay, and forms a very suitable base of operations against the quasi-independent states of Sindia and Holkar, in Rajpootana, and also to the south. As a position on the main line of communication, it has the advantages of being a commercial centre and the site of considerable railway workshops, which have attracted labor. The position would also sufficiently control the pass through which the line of railway runs, the command of which by the Asseerghur Fortress is supposed to give that position such great value, and it has an undoubted value as a military position in connection with its proximity to the great bridge across the Nerbudda, and the ready protection it could afford at the outbreak of disturbances.

On all these considerations I conceive that Khundwah is the best of the three named localities for an ordnance establishment, which in the unanimous opinion

of the Commission is needful in this part of India. From the strategic point of view, therefore, I should vote unreservedly for Khundwah; but the subject must be regarded from the practical and economical point as well, and then the existence of an arsenal at Mhow, and the certainty that that place must be the location of the troops required to overawe the native power at Indore, and that the removal of the arsenal would necessitate the construction of a new military position, occasioning a dispersion of troops,—become strong reasons for maintaining the present arsenal. If its retention at Mhow be contrary to the principle which the Commission has laid down for its guidance, namely—that the arsenal ought to be placed on the main lines of communication, its removal would equally militate against another, perhaps as important, *viz.*, that all dispersion of troops should be avoided if possible, as by the multiplication of points to be defended, they become sources of care and anxiety in the conduct of military operations. It is the fact that the present fort at Mhow is in a very unsatisfactory condition, of very weak construction and commanded by the site of the neighbouring barracks, but the fort itself admits of being repaired and strengthened so as to render it secure for the protection of stores and refugees against any enemy that cannot bring guns against it; and if a new fort must be built for an arsenal, it would be far cheaper to build it where there is a large garrison, which must be retained and is already completely housed, than to erect an entirely new position elsewhere at Khundwah. From Mhow the circle of supply will, doubtless be restricted, as Saugor and Jubbulpore can perfectly well be supplied from Allahabad as heretofore; and, as pointed out above, the Central Provinces can receive their heavier stores from Bombay; the communications between which, and both Nagpore and Mhow, are complete.

From all these considerations it seems expedient to retain an ordnance establishment at Mhow, even in face of the fact that that place is not in British territory, which would in itself, if the site was to be determined *de novo*, be sufficient reason against its being formed there.

14-1-75.

F. TURNER.

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*Minute by* COLONEL W. S. HATCH, B. A.

I have already placed on record my opinion that a second class arsenal should be established at Khundwah, and that the arsenals and depôts at Neemuch, Saugor,

Mhow and Nagpore, should be abolished. The arguments, however, which I have heard since writing the papers referred to, have induced me somewhat to modify my opinion, and I am now disposed to think it desirable that a first class depôt should be maintained at Nagpore, with a view to possible operations against certain native states named.

There is, however, another point on which I think it desirable to make a few remarks, viz., as to where an arsenal should be maintained, should the Government consider that the expense of establishing a new arsenal at Khundwah cannot judiciously be incurred. In this case I would decidedly prefer Mhow to Nagpore. The arsenal at the last-named station could only supply the troops at its own station and one other small station. Moreover, it is so far off from the main line of communication, that the stores in it could hardly be considered available for any operations in the north-west. Whereas an arsenal at Mhow could supply not only the troops at that station, but those at Neemuch, Saugor, Mehidpore and Sirdarpore; and being on a line of railway, and but 70 miles removed from the main line, would, in case of necessity, not only supply Saugor and Jubbulpore in addition to the stations above named, but could aid in the supply of stores to troops in the north-west. Mhow has already been stated to be an excellent base of operations for troops acting against the Indore or Gwalior states.

In the above remarks I have referred to Mhow and Nagpore only, because the objections on the ground of expence, which I think will probably be urged against the establishment of an arsenal at Khundwah, would tell equally against a new arsenal at any other point, and therefore as a considerable force is likely to be maintained at each of the two stations and arsenals already exist there, they may be considered the only two positions remaining to be discussed.

W. S. H.

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*Minute by COLONEL STEWART on the site for a second class Arsenal between Bombay and Allahabad.*

I have already given my opinion that the question of the best means of dividing, for facility of supply, the large tract of country which lies between Bombay, Nagpore, Saugor, Neemuch, Agra and Allahabad, renders it imperative to discuss the advisability of abolishing or maintaining the ordnance establishments at the second, third, and fourth of the above places,

as a whole, instead of in detail. There are three eligible sites for a second class arsenal between Bombay and Jubbulpore, *viz.*, Bhosawul junction, Asseerghur, and Khundwah. For the following reasons, I consider the position of Khundwah junction to be both geographically and strategically the best site for such an arsenal.

1. It shares with Bhosawul junction the advantage of being on the main line of rail between Bombay and Jubbulpore, whilst Asseerghur is 7 miles from that line.

2. It is at the junction of main line with "Holkar State Railway;" and as a break of gauge occurs here, there are many patent advantages in having the arsenal at the break.

3. It divides the distance between Bombay and Allahabad, more equally than does Bhosawul junction, being 77 miles further on eastward.

1. On the other hand, Asseerghur is a very strong position, and already has a fort, barracks, and other public buildings; but the arsenal would have to be located at the foot of the hill, as it is very steep and difficult of access.

2. Bhosawul is at the junction of the line from Bombay to Nagpore.

3. A cantonment would have to be built either at Khundwah or at Bhosawul.

#### SAUGOR.

As this place is within easy range for supply of stores from Allahabad, Nagpore and Khundwah, and has but a small force dependent on it, and bearing in mind the principles already laid down by the Commission, I do not consider that there is any necessity for the retention at Saugor of any ordnance establishment.

#### MHOW.

The Mhow arsenal should also, in my opinion, be abolished, provided there be maintained a second class arsenal at Khundwah junction, the distance from which to Mhow is only 77 miles; whilst Mhow itself is in an independent territory and on the narrow gauge.

#### NEEMUCH.

The Commission have already decided on the abolition of the ordnance establishment at this place.

#### NAGPORE.

The position of Nagpore, strategically, is in my opinion a very important one



with reference to operations in the territories of the Nizam and to the eastward, as also towards Jubbulpore, Saugor or Mhow, being practically equi-distant from each. In 1857-58, the ordnance establishment here was of great assistance in the primary organization of, and subsequent supply to, the force engaged in the Rewah, Bundelkund, and Central India districts. There is already a good road of some 164 miles in length, between it and Jubbulpore; and if railway communication were extended between these two places, its present advantages would be considerably increased. There are only two important rivers to cross—one, the *Wingunga* near its source; the other, the *Nerbudda*, which is already spanned by a railway bridge a little to the westward of Jubbulpore. The question as to the nature and maintenance of an ordnance establishment at Nagpore also requires consideration, in connection with that of the nature of such establishment to be kept up at Secunderabad. I cannot admit that Nagpore should be held to only fulfil the conditions of a mere local basis of operations against a single district; and looking to its geographical position, its comparative isolation until the railway system is extended towards Jubbulpore and Calcutta, and the important tracts of country north and south of it, as also the great use it was found to be during the mutiny, I consider that, with a second class arsenal at Khundwah junction there should be at least a first class depôt at Nagpore; more especially if, as appears probable, the Commission intend to recommend that the ordnance establishment at Secunderabad should be considerably reduced, and the main bulk of its stores withdrawn southward to Bellary, or in that direction.

A. STEWART.

13th January 1875.

*Memo. of distances.*

		Miles.
Bhopawul to Nagpore	...	244
" to Neemuch	...	270
" to Jubbulpore	...	340
	Average	285
Khundwah to Nagpore	...	321
" to Neemuch	...	183
" to Jubbulpore	...	263
	Average	255
Asserghur to Nagpore	...	290
" to Neemuch	...	334
" to Jubbulpore	...	294
	Average	306
Nagpore to Jubbulpore	...	154
" to Secunderabad	...	323

*Minute by A. L. HALIBURTON, ESQ.*

In considering the question of the best site for a second class arsenal in Bombay Presidency, it is necessary to bear in mind

the two principles which we have laid down, as those which should chiefly govern us in localising arsenals, *viz.* :—

1st.—That there should be as few arsenals, dépôts, &c, as is consistent with the efficient supply of the army.

2nd.—That, when practicable, the arsenal should be on the main lines of communication, leading from the seaboard to the frontiers.

The last principle was, as I understand, based on the following reasons :—

1st.—That arsenals placed on the main lines of communication at important strategical bases would be protected by the troops which must under all circumstances keep their communications intact; whereas if the arsenals were placed off the main lines, special detached European garrisons would have to be maintained for their protection, and for the preservation of communications between them and the main lines, at times when it might be most important to concentrate our troops in as few garrisons as possible.

2nd.—That by being on the main lines, they could be so placed as to form bases for operations right and left of those lines, and as feeders for similar establishments more advanced towards the frontiers. Whereas if they were detached and remote from the main lines of communication, their sphere of action would be necessarily limited to the locality in which they were placed.

In dealing with the question before us, we must consider, as a whole, the positions of the ordnance establishments at Neemuch, Mhow, Nagpore, and Saugor. All these establishments are off the main line of communication between Bombay and the north-west of India, and each serves chiefly as a mere local base of operation, without affording any material aid to each other, and contributing little, if anything, to the strength of the great chain of communication leading through the heart of India to the north-west. The reasons which induced the Commission to recommend that Nemuch dépôt should be reduced have already been recorded, and need not be repeated here. They apply with even greater force to the dépôt at Saugor, which should also be withdrawn.

The objections to Mhow appear to be as follow :—

1st.—It serves directly as a base of operations against Malwa, and remotely it might be of slight service in case of operations in the districts to the north of Malwa, although they would probably, in the event of war, be operated upon some firm point near Agra. As a base of operations in Malwa only, it is in a radically false position, being in the midst of jungle territory and in front instead of in rear of our position in that part of India.

2nd.—The arsenal is a mere agglomeration of semi-ruined and overcrowded godowns protected by a fort, which high authority has declared to be really no fort at all, but a mere round wall incapable of bearing the shock caused by the fire of its own guns. If Mhow arsenal be maintained, it will cost almost as much to put it into decent repair as to build a new arsenal—in fact, its repair means practically rebuilding it.

The Nagpore arsenal is in tolerable repair, though there is, I believe, a demand for some considerable expenditure on it and on the works which protect it. It is, however, like Mhow isolated from the main highways of India, and could never serve other than a local or sectional purpose. It may therefore be said of all four of these establishments that they can never serve all the purposes which such establishments should serve in order to justify their existence. If they were all closed, where could one central arsenal be placed which would combine all the purposes which each of the others now serves ?

Three places suggest themselves—

Asseerghur.

Bhosawul.

Khundwah.

Asseerghur has the advantage of possessing a garrison—a position of considerable natural strength, and a local importance in its traditions, and of being so placed as to be capable, if very strongly garrisoned, of commanding the roads leading from Khundwah to Central India. It has, however, been completely isolated by the railway, which is 7 miles distant from it; and from the nature of the hill on which it stands, it is a most incon-

venient site for supply purposes. Bhosawul, which is at the junction of the Nagpore branch rail and the Great Indian Peninsula Railway, is very conveniently situated for supplying Nagpore, but it is 70 miles from railway junction of the Holkar State and Great Indian Peninsula Railways ; and as a break of gauge occurs there, and as Bhosawul does not very conveniently divide the distance between Bombay and Allahabad, it does not present—all other conditions being equal—so many advantages as Khundwah as an arsenal site. Khundwah therefore remains, and if there be a suitable site there, it would seem to be the proper site for the second class arsenal in Bombay Presidency. An arsenal placed there could supply armies operating northwards towards Mhow and Neemuch by the narrow gauge line south-east and east in Central Provinces and in the Nizam's dominion by Great Indian Peninsula *via* Bhosawul junction and by road, or to the north-east in the districts south-west of Allahabad by the main line of Great Indian Peninsula Railway.

This one arsenal would fulfil all the services which now occupy two arsenals and two depôts ; it would release all the troops which would have to guard the four existing establishments, and it would materially strengthen the main chain of supply which leads from the seaboard to the north-west and north-east frontiers of India.

The objection to it is, that although there are barracks at Khundwah recently built at considerable cost, there is no regular garrison there, and the arsenal would have to be built. In time of war it may be assumed that an important railway junction like Khundwah would have to be held, and the force which protected it could protect the arsenal, which should be enclosed with a good substantial stone wall, loopholed and flanked. The arsenal so constructed would, indeed, add to the strength of the station and render it even more secure than it otherwise would be. The decision on this case therefore seems to me to depend a good deal, if not entirely, on two points :—

1. On Khundwah possessing a suitable site.
2. On its being practicable to build an arsenal there without any considerable increased outlay.

As to the latter, we must have further information. The four existing establish-

ments cost Rs. 95,000 a year, in round numbers. The cost of a good second class arsenal establishment at Poona is about Rs. 60,000. There would therefore be an annual saving of Rs. 35,000 by establishing this arsenal. This would represent a capital of about £80,000 ; and if to this we add the amount which it will cost thoroughly to repair Mhow and Nagpore and their defences, we shall probably find that the financial result will be in favor of Khundwah.

Provisionally, therefore, I record my vote in favor of Khundwah, subject to revision, should it prove that, on military or financial grounds, the scheme is impracticable.

Should it prove impracticable, I should then be in favor of retaining an arsenal at Nagpore, if it be necessary to relieve Bombay arsenal of its mass of stores, and reducing Mhow arsenal to a second class depôt, with reserves of ammunition for the force located there, or of having a first class depôt at each of these stations. For the reasons already given, it seems to me that Mhow is a radically false position for an arsenal, and that it would cost more to repair the existing arsenal than should be spent on a place which could perform so slight and so precarious a service.

After discussion the following resolution was submitted for decision of the Commission.

#### SAUGOR.

1. The Commission recommend that the ordnance depôt at Saugor should be abolished, as it supplies only ammunition to the troops at the station, and which can be furnished from either end of the line of railway through Kareli on the Great Indian Peninsula line, which is only 50 miles distant from Saugor, and in good communication with it by a metalled road bridged, except at the Nerbudda river.

#### NAGPORE.

2. Taking into consideration the small number of troops permanently dependent on Nagpore for supplies or equipment, the Commission decide that an establishment of the nature of an arsenal is unnecessary at that station ; such stores can be sent with despatch from Bombay, and the efficiency of the troops be perfectly maintained : but, with reference to neighbouring states, and the distance from Bombay in the event of any interruption of the communications, the Commission consider it advisable that a small siege

train should be maintained at Nagpore, and they therefore recommend that a first class depôt be kept up there.

#### MHOW.

3. They further consider that Mhow is an objectionable site for an arsenal, being off the main line of communication, being a foreign territory, and is the front, instead of the rear, of our position in that part of India; and that, apart from these objections, the arsenal and fort are so cramped and out of repair, that a very large expenditure would have to be incurred to render it and its defences efficient. They therefore recommend that it should be abandoned as an arsenal site. In the opinion of the Commission it is very important that there should be a second class arsenal somewhere on the main line of rail, between Bareilly and Allahabad; and of the three places which appear most suitable, *viz.*, Asseerghur, Bhosawul and Khundwah, so far as the information now before the Commission goes, the last place on strategical grounds seems to afford the best base for supply purposes. They have called for a report on it as to its qualifications in a military and engineering point of view; and should it be found suitable in these respects, and should the Government be prepared to incur the expenditure which its establishment will entail, the Commission strongly recommend that course being adopted. In that event no ordnance establishment whatever will be necessary at Mhow, which is only 77 miles from Khundwah. Should Government not carry out this recommendation, then the Commission suggest that fully supplied first class depôts capable of extension be maintained at both Mhow and Nagpore.

Lieutenant-Colonel Macgregor objected to the enquiry being limited to the one site of Khundwah, and proposed as an amendment "that Government be moved to cause an investigation to be made of the country on and near the line of railway, between Khundwa and Bhosawul, for other possibly more eligible sites."

On the amendment being put—

Mr. Haliburton voted for it.

Colonel Stewart voted against it.

Colonel Hatch voted against it.

Major-General Turner voted against it.

Colonel Hatch proposed the following amendment, in substitution of the para. of the resolution, commencing—"Should Government not carry out this recommendation."

“Should there, however, as is possible, be insuperable objections to Khundwah, either on the ground of financial considerations, or on that of the absence of a suitable site for an arsenal, the Commission would recommend the retention of a second class arsenal at Mhow, at which station a considerable number of troops with political or other view will probably continue to be maintained, and whence not only the troops at the station itself, but those at Neemuch, Sirdapur, Mehidpur, and Augur, can ordinarily, and, in case of necessity, those at Saugor and Jubbulpore, be supplied.”

On the amendment being put—

Lieutenant-Colonel MacGregor voted against it.

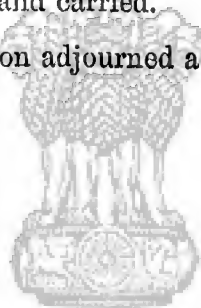
Mr. Haliburton voted against it.

Colonel Stewart voted for it.

Major-General Turner voted for it.

The resolution, as amended by Colonel Hatch, was put and carried.

The Commission adjourned at 4-30 P. M.



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*Minute No. 120, dated 15th Jan. 1875.*

The Commission met at 12 noon.

Minute 119 was read and confirmed.

The Commission continued the discussion on the number and position of the arsenals, &c., in India.

#### AHMEDABAD.

The following resolution was submitted for decision and adopted.

“Ahmedabad is 310 miles from the main base of supply of Bombay with no arsenal intervening; it is also in a conveniently central position for the supply of ammunition to the troops serving at Deesa, Erinpoorah, Rajkote and Khairwara.

For these reasons, and with reference to the possibility of operations in Rajpootana, and to the fact of the existence of forts in the neighbourhood against which the employment of heavy ordnance may be one day necessary, the Commission are of opinion that a first class depôt should be maintained at Ahmedabad.

The Commission are also of opinion that the position of the existing depôt is most objectionable, it being at a distance of 5 miles from the quarters of the troops who would have to defend it, and who could only reach it by passing through the gates, and afterwards for a distance of nearly three miles through the streets of a city which might possibly be hostile.

The Commission also desire to record that, in their judgment, the site within the cantonment selected by the Committee assembled in 1864, and approved by the present local authorities, is very suitable.”

#### POONA.

The Commission recorded the following resolution regarding the ordnance establishment required at Poona:—

“That as the grand arsenal will be maintained at Bombay, the supply of all munition of war can be made from that arsenal with perfect efficiency of the troops in the Poona division, so that an ordnance establishment of the nature of arsenal is not necessary in Poona: but it is necessary to keep reserves of ammunition there; and with reference to the risk of interruption on line of rail, owing to the difficulties of construction and the possibility of accident on the ghât section, siege ordnance should be kept there; the Commission, therefore, recommend that a first class ordnance depôt should be maintained at Poona.



## AHMEDNUGGUR.

With regard to Ahmednuggur, the Commission are of opinion that it is unnecessary to retain any ordnance establishment whatever at this station, as the troops can draw their stores direct from the arsenal at Bombay and ammunition from Poona.

## SHOLAPORE.

The Commission are of opinion that no ordnance establishment whatever is necessary here.

## BELGAUM.

“Belgaum is in communication with Bombay, Poona, and Bellary; it is 297 miles from the first-named place, of which 203 are by sea to Vingorla, and only 76 by land; it is 225 miles from Poona and only 194 from Bellary, the route to which place is by a good fair-weather road.

At present the following troops are stationed at Belgaum, *viz.*, one European and two Native regiments of infantry, with a field battery; and it further supplies Dharwar, Kolapore and Kulludghee, the troops at which three stations amount to only two Native infantry regiments.

Practically, Belgaum receives its supplies direct from Bombay; but the sea portion of the route *via* Vingorla is not considered to be available during the monsoon. The population appears to be peaceful: and taking all the above facts into consideration, the Commission are of opinion that there is no apparent necessity for the continued maintenance of an ordnance establishment at Belgaum.”

On the resolution being put to the vote—

Lieut.-Colonel Macgregor voted for it.

Mr. Haliburton voted for it.

Colonel Stewart voted for it.

Colonel Hatch voted against it.

Major-General Turner voted against it.

The resolution was therefore carried.

The Commission adjourned at 4-30 P. M. until Monday, the 18th instant, at 10½ A. M., when they decided to discuss the questions connected with the Secunderabad arsenal, Bellary depôt, &c.

*Minute No. 121, dated 18th Jan. 1875.*

The Commission met at 10-30 A. M.

Minute No. 120 was read and confirmed.

It was agreed to ask Public Works Department what progress has been made with the Rawul Pindee arsenal and fortification. Also to get information as to the extent to which repairs of regiment or garrison equipment that cannot be done by their establishments are effected in arsenals.

The Commission continued the discussion as to the number and position of arsenals in India.

The following memoranda on Secunderabad arsenal were read :—

*Memo. by MAJ.-GENL. TURNER, C.B., R. A.  
SECUNDERABAD.*

The enquiries made by the Commission, and the inspection of the ordnance establishment at Secunderabad, confirm me in the opinions I had previously formed regarding the necessity or otherwise for an arsenal here, as set forth in the following extract from a report submitted by me to Government :—

30. " With regard to the Nizam's territories, the lines of railway uniting Bombay and Madras, and the extension of the Nagpore branch to Chanda on its northern boundary, afford rapid means for military operations of troops from any of the three presidencies, so that the force maintained at Secunderabad and neighbouring stations cannot possibly be considered in an isolated position, dependent only on its own resources; an arsenal therefore for the provision of ordnance stores for the troops in the territory only is not necessary. It is necessary that the troops should be amply supplied with ammunition, and with everything needful to render them offensively and defensively an efficient force; but there is no necessity for maintaining there the reserves of an army, or the means of renewing equipments, that can be obtained without delay from an arsenal at Bombay, or of arming and equipping a large additional force.

31. The force at Secunderabad and its neighbouring stations consists of every branch of an army, including a horse field battery, and is most complete in itself, and it does not require more than reserves of ammunition, which a good dépôt would provide."

Connected with this ordnance establishment is the supply of military stores to the troops of the Hyderabad Contingent, for

which magazines are maintained at Aurungabad, Ellichpore, and Hingoli, and it has been proposed to re-open the ordnance establishment at Bolarum for the supply of troops at that station and Lingasagur; but the object (in memorandum by Military Secretary) seems to have been on account of financial considerations only, and not because such establishment has a military requirement. Objection has been raised against the charge of 35 per cent. on the value of stores supplied from the Madras Government ordnance establishment, which, it must be allowed, is an excessive demand. The real enquiry seems to be, whether there is any special reason why the troops of the Nizam's Contingent should have ordnance magazines at all stations for supply to them of military stores; and on this point it may be observed that since the mutiny period, 17 years ago, there has been no instance of the troops of the force being employed, and that they are practically in exactly similar conditions of service as troops under the Government of India in all other parts of the country, more particularly their condition is similar to that of the troops of the late Sindia's Contingent, which were all entirely dependent on the Agra (then called) magazine. This force was cantoned over the country from Gwalior to Boorhanpore on the Taptee, and had no supplies of stores beyond their full service equipment, as is the practice in the case of troops in Bengal generally; and there can be no reason why a different arrangement should be maintained for this Contingent at the present time. Ellichpore is connected with Bombay by rail to Umrawattie, and thence by a metalled road about 40 miles distant. Hingolee is about 100 miles south of the rail from Akola, and reached by a metalled road, and Aurungabad may be 70 miles distant from the rail at Nonagaum by ordinary road. In a military point of view, these numerous small arsenals would become sources of very serious embarrassment in the event of any really important operations and movement of troops in this quarter shutting up at least a third of the forces for their protection. All these detached stations could, with perfect efficiency, be supplied from Bombay, and the whole of their surplus stores should be withdrawn and the *personnel* reduced. Bolarum and Lingasagur should be supplied as are the troops at Secunderabad. The regiments and batteries should have means of repairs by regimental establishment as it is supposed that they have, and be independent of an ordnance estab-

ishment, otherwise they are not fit to take the field and cannot be considered efficient. The whole of the ordnance establishment of the Hyderabad Contingent ought, in my opinion, to be abolished at once, and the requirements of corps, &c., furnished direct from arsenals and charged for at an equitable rate. It is correct that the Government of India allow one-tenth of original cost for condemned or obsolete stores sent back, but it should be remembered that if the Contingent funds lose by the transactions about cartridges, referred to in Military Secretary's memorandum (which, however, is altogether questionable), they gain in respect of other unserviceable munitions of war which are of no value whatever to the Contingent, as Government will not allow their sale.

The ordnance depôt should be located in the Trimulgherry entrenchment and the lower arsenal given up altogether. Further and great objections against maintaining an arsenal at Secunderabad are, that it is not in British territory, and that the position at Trimulgherry is an insecure one, being commanded by neighbouring hills, and the profile of the works too low to prevent the interior being raked by fire from an enemy's batteries judiciously placed on ground of about the same level. The defects of the position are well known to the Government of India.

Military Department No. 152, dated 27th October 1873, to Government, Madras.

*The 18th January 1874.*

*Memo. by COLONEL HATCH, R. A.*

#### SECUNDERABAD ARSENAL.

This arsenal appears to be maintained for the supply of only the troops at Hyderabad and the depôts at the outlying stations of the Hyderabad Contingent. These last can, it is evident, with the exception of Lingasagur, be more conveniently and economically supplied direct from Bombay, and that station can be supplied from Madras.

The question is therefore reduced to the supply of the troops at Hyderabad itself.

That cantonment is connected by rail and road with both Madras and Bombay, but is 128 miles off the main line of rail; it therefore so far does not fulfil the conditions laid down as essential for a site for an arsenal. A still more serious objection remains to be noted—namely, that it is in a foreign country, within a few miles of a city crowded with a population fanatic and notoriously turbulent, who may at

any moment be stirred up to active hostility against us. The new arsenal at Trimulgherry itself also is in a very bad position, being placed in a work which is commanded on no less than three sides by the hills around it. On these grounds I consider that no arsenal should be maintained at Hyderabad, and that, as owing to the existence of a heavy field battery, a siege train is unnecessary, a second class depôt only is required.

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*Memo. by A. L. HALIBURTON, ESQ.*

I concur in the views expressed by General Turner. The force quartered in the Nizam's dominions is maintained there for local purposes, and should be regarded as a field force ready to move in any direction within those dominions or beyond those if required. The whole district being foreign territory, any place in it is manifestly unsuitable as a base of operations for our force. The base of operations in the Nizam's dominions should be in British territory, while the advanced troops in the dominions should be fully equipped and ready to march on service at any moment. I consider, therefore, that the troops having their full service equipment only require a depôt of ammunition at their chief station, and should depend for general stores on the reserves in the arsenals and depôts at Madras, Bombay, Bellary, Poona, and Nagpore.

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The following resolution was submitted and adopted :—

“The Commission generally concur in the views set forth by the President, Colonel Hatch, and Mr. Haliburton, in their memorandum, and are of opinion that a second class depôt only should be maintained at Secunderabad; and the ordnance establishment of the Hyderabad Contingent abolished.”

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*Memo. by COLONEL STEWART, R. A.*

BELLARY.

I look upon Bellary as an important strategic point for operations throughout the centre of Southern India, situate as it is practically midway between the territory of the Nizam and that of the Mysore State, as also between Poona and Madras, and not far from the Southern Mahratta Country. There is already a good ordnance depôt there, capable of being at any time increased to the status of a second class arsenal. There is a fort,

capable of defending the depôt against any attack likely to be made against it. Bellary is also favorably placed for supplying troops at Secunderabad in case of pressure, as also Dharwar, Lingasagur, Kulladghee and Belgaum, either directly or for an alternative source, as occasion may require. It is 305 miles from Madras and 400 miles from Poona; and, looking at the reduction of the first class arsenal at Secunderabad to the status of a second class depôt, the distance between Madras and Bombay, *viz.*, 792 miles, principally by a single line of rail, and the probable reduction of some more of the working ordnance in Southern India, in my opinion there should be maintained at Bellary a first class depôt capable of being at any time increased to the status of a second class arsenal. As the arsenals both at Bombay and Madras would have their hands full in the event of operations across sea, I think there should be the means of forming at any time for Southern India, a working ordnance establishment subsidiary to them; and under existing circumstances I see no better place for its location than Bellary. Gooty and Goolburga offer alternative sites; but as there would be much extra expense in taking up either of these, I give the preference to Bellary.

18th Jan. 1875.

A. STEWART.

The following resolution was adopted in regard to Bellary :—

The Commission concur generally, and recommend a first class ordnance depôt, capable of conversion to a second class arsenal should emergency arise.

18th Jan. 1875.

F. TURNER.

The Commission adjourned at 1-30 P.M. until the following day at 12 noon, when it was decided to discuss the question of the retention or abolition of the magazines at Bangalore, Cannanore, and Trichinopoly depôts, &c.

The Commission met at 12 noon.

*Minute No. 122.*

Minute No. 121 was read and confirmed.

The Commission continued the discussion of the number and position of the arsenals in India.

They adopted the following resolution with regard to the Bangalore magazine:—

#### BANGALORE.

“Though Bangalore has considerable advantages as a strategical position in operations against Misor, it cannot be said to have any strategical importance as a base of supply for the troops in Southern India. It is situated at the end of a line of railway, and could never conveniently supply any troops but those actually stationed at it, and being 216 miles only by rail from Madras, could itself be easily supplied from that arsenal.

Looking, however, to the possibility of operations in Misor, the Commission are of opinion that it would be necessary to maintain a siege train at that place, and would, therefore, recommend that its magazine be reduced to a first class dépôt.

The Commission further report that the existing arsenal in the fort, distant some three miles from the barracks of the troops at Bangalore, is in a very insecure and unsuitable position, the fort itself being in a dilapidated condition and nearly surrounded by the town, which partly intervenes between it and the cantonment, and commanded by neighbouring higher ground; the buildings containing the stores are also in a ruinous state, so that the construction of suitable buildings for the ammunition and ordnance stores in another position seems absolutely necessary. With regard to this new position, the Commission concur generally in the views set forth by the Commission, whose report has been communicated with Military Department No. 1320, dated 27th November 1874, and are of opinion that the position recommended possesses many advantages if required for a place of refuge, and would suit very well for the protection of the ordnance dépôt.”

#### CANNANORE.

Resolution was proposed and adopted:—

“The Commission consider that the dépôt at Cannanore should be abolished. It supplies ordnance stores and ammunition which it receives from Madras to one battery and one British infantry and three Native infantry regiments quartered at Cannanore and its out-posts, and

Mangalore, and effects repairs to soldiers' boxes and regimental equipments, &c. The troops, if supplied with the full service allotment of ammunition, will probably never require an emergent supply; but should they do so, they can receive it at once direct from Bombay or Madras, while the repairs referred to should be locally effected regimentally, or by the proper *depôt* contract.

Should the fort be armed as recommended by His Excellency the Commander-in-Chief of Madras, the armament and its ammunition would be placed in artillery charge."

#### TRICHINOPOLY.

The following resolution was proposed and adopted:—

"The Commission are of opinion that the ordnance establishment at Trichinopoly should be abolished for the following reasons:—The communications of Trichinopoly are very good, it being connected with Madras by two lines of railway, by sea and rail through Negapatam, and with Bombay by sea and rail through Beypore; it does not now, and cannot in future, supply more than the few regiments in its neighbourhood, *viz.*, two companies British infantry, 1 field battery, 5 battalions native infantry, one of which is on the sea and could be supplied from Bombay if necessary, and there seems no likelihood of any disturbances in the neighbourhood which would call for any further reserve stores than the troops would be provided with."

#### RANGOON.

The following resolution was proposed:—

"Rangoon is a place of rapidly growing commercial importance and the base of military operations in Burmah: it is the capital of a country with a foreign speaking population, and isolated from the main land of India. There will in all probability be considerable river defences thrown up requiring heavy armaments, and there are one field, one mountain, and two garrison batteries of artillery, one company sappers, with two European and four regiments native infantry distributed throughout the province; the frontier stations Thyetmyo and Tonghoo being distant some five and twenty days' journey respectively from Rangoon. The route to Thyetmyo will be shortened in point of time by the rail to Prome. The communication with Thyetmyo is effected by flats towed by steamers on the Irrawaddy



river, and in the Tonghoo by country boats by the Pegu and Sitang rivers, which route is only available at new and full moon. The road communications are incomplete, and in some parts very bad, especially between the two out-posts along the line of the frontier. Taking all the above into consideration, the Commission consider that there should be a second class arsenal at Rangoon on the site of the present ordnance magazine, which is very well suited for all requirements, and well defended."

#### THYETMYO AND TONGHOO.

"Supposing the regular allotments of the troops to be fully maintained, the Commission see no good reason why periodical supplies to the former out-post for replenishing the equipment should not be made direct to regiments and batteries from the ordnance establishment at Rangoon as at present; on the contrary, they consider that this arrangement would facilitate the supply to the troops. The out-post of Tonghoo, however, is differently situated. It is isolated and can only communicate with Rangoon by a long and tedious river communication, while, it is understood, that the communications on the Burmah side from Mandalay are good, and thus the post is more easily open to attack than to reinforcement from our own base. On these grounds they recommend the abolition of the ordnance depôt at Thyetmyo and the retention of a second class depôt at Tonghoo."

The following amendment was put by Lieutenant-Colonel Macgregor:—

"The Commission are of opinion that the ordnance establishment at Rangoon should be reduced to a first class depôt.

Rangoon is in easy communication by sea with both Madras and Calcutta, either of which could conveniently supply all the wants of its small garrison in time of peace. In time of war the troops in Burmah would be quite competent to hold their own with their own reserves of ammunition and those which would be at Rangoon, and should operations to the north be undertaken, it would be an object to advance the ordnance establishments required for the work of that campaign as far on to the front as possible. The whole of the troops required for these operations would be sent from Calcutta and Madras, only four or five days distant; and all necessary ordnance stores could conveniently and economically be forwarded at the same time.

As Thyetmyo is only five days distant from Rangoon by a river navigable for steamers all the year round, and will shortly be brought nearer by the railway to Prome, and as the troops would be supplied with full ammunition, there seems to be little necessity for a depôt here. A second class ordnance depôt might, however, be maintained at Tonghoo, the communications with which are of a considerably more difficult nature."

The amendment was put to the vote.

Mr. Haliburton voted against the amendment.

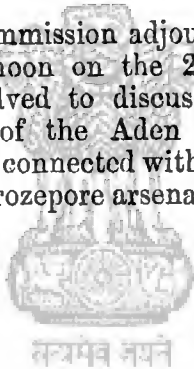
Colonel Stewart, voted against the amendment.

Colonel Hatch voted against the amendment.

Major General Turner voted against the amendment.

The original resolution was, therefore, carried.

The Commission adjourned at 4-30 p. m. until 12 noon on the 21st instant, when they resolved to discuss the retention or abolition of the Aden arsenal, and the questions connected with the position, &c., of the Ferozepore arsenal.





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MINUTES OF PROCEEDINGS  
OF THE  
SPECIAL ORDNANCE COMMISSION.

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*Minute No. 123, dated 21st Jan. 1875.* The Commission met at 12 noon. Minute No. 122 was read and confirmed.

The Commission proceeded to discuss the Aden arsenal.

The following resolution was submitted and adopted :—

“The Commission are of opinion that, with reference to the extent of the Aden defences—the number of guns mounted thereon, reserves for which must be kept up on the spot—the distance from the base of supply, Bombay (which even in fair weather involves a passage of nearly ten days in each direction)—the fact that as regards powder and ammunition, communication, owing to the refusal of the Peninsular and Oriental Company to carry combustibles between Aden and Bombay, is closed for four months in the year—the difficulty of procuring workmen, &c.,—an ordnance establishment of the nature of a second class arsenal is necessary at that station.

The Commission are further of opinion that the non-commissioned officers and lascars now detailed from the Aden arsenal for the care of the ordnance on the works at Aden should belong to the batteries, the care of ordnance in forts, &c., not being a legitimate ordnance duty.

They also observe that the Aden Arsenal appears to be called on to perform for the Public Works and Commissariat Departments certain duties which do not legitimately belong to an arsenal, and of which they consider the arsenal should be relieved.

On these grounds, and with reference to the small number of troops at the station, the Commission consider that although a second class arsenal should be kept up, the establishment should be reduced below its present extent, which appears to be much in excess of the ordinary requirements of the station.”

The Commission read and discussed the papers connected with the Ferozepore Arsenal.

Adjourned at 4-30 p. m. until 12 noon on the 22nd instant, when it was decided to continue the discussion on the Ferozepore Arsenal.



*Minute No. 124, dated 22nd Jan. 1875.* The Commission met at 12 noon. Minute No. 123 was read and confirmed.

No. 2594 of 9th January 1875, from the Examiner, Ordnance Accounts, Madras, furnishing the annual returns of military stores at Tonghoo and Thyetnyo, was laid before the Commission, and it was decided that the papers might be retained for the present.

Military Department, Government of India, No. 1621, dated 31st December 1874, regarding Hyderabad Arsenal and its unhealthiness, re-submitted to the Commission, and decided that reply be made that the Commission have no recommendations to make connected with the sanitary arrangements at Hyderabad, as in their report they will advise the removal of the arsenal at that station.

Inspector General of Ordnance No. 2423N, dated 11th January 1875, on the question of the Master Refiner at Kirkee, re-submitted, also Government of India, Military Department, No. 1024 of 20th January 1875, on the same subject. Decided that no further action is necessary.

The following resolution was submitted and adopted :—

“ In considering the position of the arsenal at Ferozepore, the question as between this place and Mooltan must be considered as settled by Military Department No. 725, dated 13th March 1874, with the conclusion in which the Commission, however, fully agree, as shown in their resolution regarding Mooltan; but they deem it their duty to place on record their opinion regarding the faulty position of the arsenal at the former place.

In the words of Sir William Mansfield, the position of Ferozepore has no military meaning, or rather its only meaning in a military sense violates the important principle of war, which requires that the base of supply shall be on the main line of communications and in the rear (of the centre of the front) and as near as possible.

Ferozepore is 80 miles to the left of the main line of railway at Loodiana, while it may be said to have no communication with its rear, to its front it is cut off by a broad river, difficult of passage, and its present communications, such as they are, only exist because of the arsenal.

In the event of our being driven back from Lahore, the position of Ferozepore would cause us most serious embarrassment; for whether we strove to protect the arsenal by assembling a force in its vicinity, as we did in the Sutlej campaign, or we

left it with a sufficient garrison to hold its own, we should be in a serious dilemma. In the first case, this force might be cut off from its communications, and in the latter our military stores might be cut off from the army.

It must further be remarked that nothing which can be done can ever alter its radically faulty position. It would, of course, be possible to improve its defences, but such a perseverance in error could only have the effect of exposing us to the chance of greater disaster hereafter. Again, improvement in its communication with the main line by a railway would certainly to some extent decrease the defects of the position, but the Commission cannot take upon themselves the responsibility of recommending such large expenditure as would be entailed for objects which would not in any sense add to the military strength of the country.

On these grounds, therefore, the Commission are of opinion that the arsenal should be moved from Ferozepore, and would call attention to the advantages of the following sites which all seem superior to Ferozepore :—

Loodiana, situate 291 miles from Rawul Pindie, 324 from Multan, and 623 from Allahabad, has considerable advantages. It is situate in rear of the five rivers of the Punjab, is on the main line of railway, and at the junction of the road to Lahore *via* Ferozepore. On the other hand, it has but few buildings, and has on sanitary grounds already been abandoned as a military cantonment, and its position would seem too advanced in event of a repulse in the Punjab.

Umballa, a large military cantonment, 71 miles south-east of Loodiana, presents an alternative site. It has already a large garrison, affords suitable sites, and is at the junction of the railway, the Grand Trunk Road, and the road to the stations of our main European reserves on the hills; but the difficulty of water-supply affords an objection.

The Commission have been informed by the Public Works Department that little success has attended the experimental artesian boring, and that the Government of India have abandoned further proceedings in favor of the project for supplying water from the Guggur stream.

The arsenal and fortress could not be dependent on a distant supply liable to be cut off, and if water cannot be obtained on the spot which might be selected for an arsenal and fortress, Umballa cannot

be considered as a proper place for the purpose.

Saharunpore, or rather a position near that station, in rear of the line of the Jumna, and covering the railway bridge, still further to the south-east, 412 miles from Rawul Pindi and 515 miles from Allahabad, has the advantage of being placed in a secure position behind the Jumna. It is also at the entrance to the plains of Hindustan and at the intended junction of two lines of railway and 121 miles from the Sutlej, thus affording a good strategic base for the supply of our troops even after the loss of the Punjab, while in time of peace the short extra distance it is to the rear by railway would be of little consequence; on the other hand, a totally new position would have to be taken up here, thus causing considerable expense and greater dispersion of troops.

The Commission are of opinion that Saharunpore is, on the whole, the best strategic position, but that Umballa has superior advantages on a financial point of view, while its strategic position is but little inferior. Therefore, if the difficulty regarding the water-supply can be surmounted at Umballa, its advantages would outweigh those of Saharunpore."

The Commission having laid down the positions of the several arsenals for all India, resolved to adjourn until their proceedings so far can be fairly drafted by the Secretary, when they would re-assemble and review the sites selected; meanwhile the Sub-Committees to continue the duties assigned to them.

Adjourned at 4-30 P. M.



The Commission met at 12 noon. Minute No. 125, dated 3rd Feb. 1875. Minute No. 121 of 22nd January 1875 was read and confirmed.

The general recommendations with regard to the number and positions of arsenals, &c., in India were reviewed, and with regard to—

#### KURRACHEE.

The following resolution was proposed and adopted :—

“The Commission consider that the number of troops, including those in Sind, that will ever come to be supplied from Bombay will not be in excess of the power of that arsenal, and therefore that it will not be necessary to maintain at Kurrachee a larger establishment than a first class depôt which can, if found necessary at any time, be put on the footing of a second class arsenal. The space of the present buildings can be extended by the addition of upper-stories to the existing store-rooms, the re-building of that which was burnt down some years ago, and the construction within the octagon of an additional store-room, the ground-floor of which would form gun-sheds; the powder magazine ought to be protected by an earthen traverse and surrounded by a wall, connecting it and the depôt in one enclosure, and protected by a simple defensive work of the character proposed by Colonel Woolcombe and Captain Merri-man. Measures should be taken to prevent any further encroachment by building on the open ground around. In case of a larger place of refuge being required, it could form part of the general scheme.”

#### BELLARY.

Colonel Stewart, proposed the following amendment in the resolution regarding Bellary :—

“With reference to my minute (page 272) on the subject of the ordnance establishment required at Bellary, I propose to erase the words “a first class depôt capable of being at any time increased to the status of” after the words “there should be maintained at Bellary,” so that the sentence may read “there should be maintained at Bellary a second class arsenal,” and that the resolution of the Commission be altered to the same effect.

The votes of the Commission were taken on the two points contained in the above, viz. :—

1st.—Shall Colonel Stewart's minute be altered as desired. This was passed.

2nd.—That the resolution passed by the Commission be amended, and that a second class arsenal be maintained at Bellary.

Lieutenant-Colonel Macgregor voted for it.

Mr. Haliburton voted for it.

Colonel Hatch voted against it.

Major-General Turner voted against it.

The resolution to be altered accordingly.

#### ADEN.

The following resolution was proposed by Lieutenant-Colonel Macgregor :—

“ Bearing in mind the small number of troops to be supplied, the facility of communication with Bombay, and that its armament will be fully supplied with all the needful reserve stores, the Commission is of opinion, on further consideration, that it will only be necessary to maintain a first class ordnance depôt at Aden.”

Mr. Haliburton voted against the resolution.

Colonel Stewart voted against it.

Colonel Hatch voted against it.

Major-General Turner voted in favor of it.

The resolution was therefore lost.

#### AGRA.

The following resolution was proposed by Lieutenant-Colonel Macgregor :—

“ Looking to the distance (609 miles) which intervenes between Allahabad and Ferzepore, and to the faulty position of the latter place, the Commission are of opinion that, should Government not concur in their proposal to remove the arsenal from Ferozepore to a site of greater safety and military aptitude, a second class arsenal should be established at Agra.”

Mr. Haliburton voted against the resolution.

Colonel Stewart voted for the resolution.

Colonel Hatch voted against it.

Major-General Turner voted against it.

The resolution was therefore lost.

The following summary of the resolutions passed was submitted :—

#### FACTORIES.

1. That the gunpowder factories be recommended to be maintained in their present positions at Ishapore, Madras, and Kirkee.

2. That small-arm ammunition factories be recommended to be maintained at Dum-

Dum and Kirkee as at present, with such alterations to the one or the other as may be necessary.

3. That the foundry and shell-factory be recommended to be retained in its present position at Cossipore.

4. That a gun-carriage factory be recommended to be maintained at Allahabad.

5. That the harness and saddlery factory be recommended to be maintained in its present position at Cawnpore.

#### ARSENALS.

The Commission recommend that first class arsenals be maintained at the following places :—

Bombay.

Calcutta.

Madras (St. Thomas' Mount).

At some point on the main line of railway between Loodiana and Saharunpore, the Ferozepore Arsenal being removed to the place selected.

Allahabad.

Second class arsenals at Rawul Pindi, Khundwa, and if this position be found unsuitable, at Mhow; Bellary, Rangoon, Aden.

Depôts at the following places :—

Kurrachee, 1st class, convertible, if found necessary, to a 2nd class arsenal.

Mooltan, 1st class.

Agra, 1st class, retaining its capability of being increased to an arsenal, if found necessary hereafter.

Nagpore, 1st class.

Ahmedabad, 1st class.

Poona, 1st class.

Bangalore, 1st class.

Peshawar, 2nd class.

Secunderabad, 2nd class.

Tonghoo, 2nd class.

2. That the following arsenals and depôts be recommended to be abolished :—

Hyderabad (Sind) Arsenal.

Mhow arsenal, on the condition that a second class arsenal be formed at Khundwa.

Belgaum arsenal.

Dera Ismail Khan Depôt.

Bareilly                                 ,,

Neemuch                                 ,,

Saugor                                 ,,

Ahmednuggur Depôt.

Sholapore „

Cannanore „

Trichinopoly „

Thyetmyo „

The summary was adopted as embodying the views of the Commission.

The Commission adjourned at 4-30 p. m. until 12 o'clock 4th February, when they decided to (1) settle the mode of dealing with the question of factory accounts; (2) and discuss the number and position of gun-carriage factories required in India.



सत्यमेव जयते

The Commission met at 12 noon.

*Minute No. 126, dated 4th Feb 1875.*

Minute No. 125 of 3rd February 1875 was read and confirmed.

In accordance with the decision in Minute No. 125, the question of the mode in which the subject of factory accounts should be dealt with in the report was discussed, and a memorandum on the subject was read by Colonel Hatch. Decided that the memorandum should be completed and re-submitted.

The question of the number and position of gun-carriage factories in India was discussed, and a memorandum on the subject was read by the President, and a memorandum by Colonel Stewart handed in to the President. The discussion was adjourned at 4-45 P. M., until 12 noon on the 5th instant.



सत्यमेव जयते

*Minute No. 127, dated 5th Feb. 1875.* The Commission met at 12 noon. Minute No. 126 of 4th February 1875 was read and confirmed.

The discussion on the number and position of the gun-carriage factories for India was continued.

Memorandum by Colonel Hatch was read.

Ordered that the papers regarding the climatic conditions of Futtehgurh, Allahabad, Madras, Poona, and Bombay, be sent to Mr. Willson, Assistant Meteorological Reporter, with a request that he would give his opinion on the conditions as to dryness and dampness of each of the above places; and also of Calcutta.

The Commission adjourned at 4-30 P. M. until 12 noon on the 8th instant, when it was decided to continue the discussion.



The Commission met at 12 noon. *Minute No. 128, dated 8th Feb. 1875.*  
Minute No. 127 of 5th February 1875 was read and confirmed.

The question of the buildings projected for the Rawal Pindi arsenal was brought forward by the Secretary.

Resolved, that although Rawal Pindi will be a second class arsenal, there will be a large body of troops dependent, probably not fewer than 10 to 12,000 men; and from the importance of its position, full reserves will need to be maintained, and the Commission will not advise any alteration in the project.

Colonel Hatch brought forward certain points of difference in the executive work of arsenals, &c. They were considered in succession by the Commission.

Adjourned at 4-30 p. m. till 12 noon on the following day, when it was decided to resume the discussion on gun-carriage factories.



*Minute No. 129, dated 9th Feb. 1875.*

The Commission met at 12 noon. Minute No. 128 was read and confirmed.

The discussion on the position of the second gun-carriage factory for India was continued.

Memorandum by Mr. Willson, Meteorological Reporter, was read.

Minutes, as follow, by the President and by Colonels Hatch and Stewart were finally handed in and recorded.

---

*Memorandum on Gun Carriage Factories required for India.*

The selection of the best site or position for a gun-carriage factory "for all India" has been under consideration; but it is understood that Government have given up the project of only a single factory, and the Commission desire to record their opinion that, on the ground of due facility of supply and the necessities of the public service, which are not confined to the equipments of field artillery; and also, especially, to the very great extent of country over which the royal artillery batteries in India serve, a second factory is necessary.

The Commission have already submitted a separate report regarding the removal of the gun-carriage factory from Futtehghurh to Allahabad. The objections against its retention in an isolated position were raised after the mutiny, when the factory fell into possession of the rebels, and have been recognized as of equal force at the present time. The Commission recommended its removal to Allahabad, and suggested a site within or adjoining the Khushroo Bagh, and they hold to the same view now.

Allahabad offers itself as the most suitable, because of the fort and its great strategic importance, and also because three-fifths of the field artillery are located in Upper India, in which it is central; and there exists direct communication by rail with the eastern and south-western extremities of the Bengal Presidency, and also with Central India. Allahabad possesses the advantage of being near timber supplies, of having command of abundant and cheap labor, and of ordinary fuels (wood, country coal and charcoal) being cheap; on the other hand, supplies of metals, English coal and teak timber, have to bear enhanced charges on account of transport from Calcutta. The locality has to a great extent, though not equal to Futtehghurh, the advantage of a dry climate, in which wood can be seasoned and fitted to bear ex-



posure to the great heats of Upper India; and being the seat of the Government of the North-Western Provinces, at the junction of the railway communication to all parts of India, it possesses greater resources of supply and labor than probably any but the Presidency cities. The cheapness of labor and local supplies acts as a set-off against the additional cost of imported material, in comparing the manufacturing results obtained in this and the other factories. For the above reasons, the Commission consider that Allahabad is entirely a fitting locality for a gun-carriage factory.

With regard to a second factory, it must be stated that the joint requirements of the other two presidencies in field artillery equipment, are equal only to about two-thirds of what are needed for Bengal. At Bombay, however, there are occasional demands for naval equipments, and somewhat heavier coast armaments will have to be provided, though the latter will be needed for Madras, including Burma and Bengal.

According to the statements received, there have been built during the ten years ending 31st March 1874 the following number of carriages of all kinds :—

In the Bengal Factory, 1,032 or 103 $\frac{1}{2}$  per annum.  
 Madras „ 947 or 94 $\frac{3}{4}$  „ „  
 Bombay „ 397 or 39 $\frac{7}{8}$  „ „

and issued to batteries and armaments during the same period, as follows :—

In the Bengal Presidency 1,317 or 131 $\frac{7}{8}$  per annum.

Madras „ 646 or 64 $\frac{3}{4}$  „ „  
 Bombay „ 397 or 39 $\frac{7}{8}$  „ „

Further, there have been many miscellaneous stores for ordnance purposes and other departments made up in the several factories, and especially at Bombay, in the manufacture and repair of barrack furniture, for all which provision will have to be made in the event of abolition of one or other of the Madras or Bombay factories. In the Bombay factory such miscellaneous work for 1874-75 was estimated at Rs. 55,081 for sixteen different departments. At Madras, on the abolition of the bullet factory, the machines for manufacture of fuzes, friction tubes, &c., and powder barrels, were set up in the gun-carriage factory; it is believed possible to transfer all laboratory and cartridge manufacture to one of the existing small house ammunition factories, and to make up all barrels of the gunpowder factory as done in the factories at Ishapore and Kirkee.

The comparative statements of cost of labor and material at Madras and Bombay

Metals and coal Rs. 5-4 per ton, and oak Rs. 2 8 per cubic foot.

*Carriages.*

Coast and Harbour	...	35
Garrison	...	12
Ship Truck	...	28

appear to have been manufactured in the Bombay Gun-Carriage Factory during the ten years ending 1873-74.

\* See figured statement A appended.

show that labor\* is cheaper at Madras, even as regards the rates paid to the corps of Carnatic artificers, thus—

*Madras, Carnatic, Artificers.*

1st class foreman	Rs. 55 per mensem.
2nd „ „ ... „	45 „
3rd „ „ ... „	40 „
1st class artificer ... „	25 „
2nd „ „ ... „	20 „
3rd „ „ ... „	15 „

*Bombay.*

Head mistry carpenter...	60 per mensem.
1st Class Mistry ...	45 „
2nd „ „ ...	40 „
Filers from Rs.	1 to 1-4 per day.
Carpenters „	0-13-0 to 1-4 „
Smiths „	1-4 to 1-6 „

The Carnatic artificers are entitled, in addition, to family allowance, clothing and pension, which may be estimated between Rs. 4 and 5 per month per man.

With regard to material, freight to Madras, including landing charges, is lower than to Bombay; the facility and cost of the supply of timber to the two places is about equal: but should the factory be established at Poona, instead of Bombay, the rates of all imported supplies and timber will be higher than at Madras, as follows:—

	Rs. A. P.
Freight and transport from	
England to Madras ..	26 5 8 p. ton.
Ditto to Bombay ...	28 0 0 „
Ditto to Poona ...	45 4 5 „
Timber will have to bear the	
cost of transport from Bom-	
bay to Poona ...	17 4 5 „

A gun-carriage factory exists at Madras in full working condition; but objection has been raised against its position, on the ground of its being within range of the guns of any hostile vessel that might appear in the Madras roads. The factory is about 3,200 yards from the anchorage nearer than which a vessel of the class referred to could not approach the shore; it is impossible to believe that Madras, the seat of Government of a Presidency, with its very large population and varied interests, will be left without some defence, which would at least prevent hostile vessels approaching within two or three thousand yards of the anchorage. The factory is surrounded by houses, and in no particular whatever offers any distinct mark for an enemy's fire; the apprehension of its bombardment from the sea is therefore so nearly groundless, that the expense of its removal on that account only could not reasonably be incurred. Even a chance shell reaching it would occasion only partial destruction, which

could be repaired at comparatively trifling cost. Another objection is that the factory is in the midst of the town of Madras, too closely surrounded by houses, and liable therefore to tumultuary attack. This, however, can be sufficiently guarded against by a good, strong, crenellated wall and gates, with towers at the angles to afford flanking defence. The populace of Madras is notably peaceable, and it is only by leaving the place without such protection, thereby inviting attack, that any damage could occur should a sudden émeute take place.

The present factory at Madras is somewhat cramped for room, and if made the sole carriage building establishment for both Western and Southern India, would need extension, which is quite feasible, as on one side is the parade-ground of a native infantry regiment about, it is understood, to be moved elsewhere, a portion of which might be taken into the factory and good workshops erected thereon, the existing workshops being converted into store-rooms. This ground being Government property and available, the cost of this extension, including the surrounding wall, will probably not exceed one and a quarter lakh of rupees.

Further, there is an objection against Madras as the site of a gun-carriage factory which must be alluded to as it is of the utmost importance, and that is the dampness of its climate and the consequent difficulty in seasoning timber there sufficiently to withstand the destructive effect of the dry heat of the Dekkan, the Central Provinces, and those to the north of the Nerbudda, and in Seinde. The same objection has been raised against the climate of Bombay, and the removal of the gun-carriage factory to Poona in part effected in consequence. The following figures show the relative heat and dryness of the several places :—

	TEMPERATURE.			HUMIDITY.		
	Maximum.	Minimum.	Range.	Maximum.	Minimum.	Range.
Madras ... ..	102°	66°	36°	91	28	66
Poona ... ..	101°	51°	47°	83* 92†	41 26	42 66
Bombay ... ..	100°	55°	45°	98	51	47
Allahabad ... ..	117°	30°	78°	100	15	85
Futtehghur ... ..	117°	30°	87°	98	6	92

\* From incomplete return—Poona Observatory, dated 12th December 1874.

† From report from Meteorological Observatory, Poona, dated 119th September 1874.

With regard to Bombay and the maintenance of a gun-carriage factory in the western presidency, it has been above stated that, in consequence of its unsuitable climate, its part removal to Poona has

been already effected; and it must further be stated that Government are under engagement to make over the ground on which it stands at Bombay, to the Bombay and Baroda Railway Company, and desire to fulfil the same; so that it may be said that, virtually, the factory does not exist, and that a new one, if one is to be maintained in that presidency, has to be constructed. Two estimates have been put forward—one for a new factory altogether at Kirkee, at the cost of Rs. 6,42,772; the other for conversion of the present arsenal buildings at Poona, at the cost of Rs. 1,32,276. Should the latter arrangement be adopted, it will be necessary to construct a new ordnance establishment at Kirkee; and the Commission have recommended a first class ordnance dépôt, which, it is believed, will cost considerably less than the sum (Rs. 5,33,176) estimated for the “arsenal as lately revised;” which, it seems to be admitted by all authorities, ought to be placed within the intended fortified position at Kirkee, the construction of which is wholly independent of the transfer of the gun-carriage factory to the arsenal buildings at Poona, which it is proposed to relinquish. These buildings can very readily, and for the moderate sum stated, be rendered in every way suitable for a carriage factory; but it is open to serious consideration whether Government will deliberately, in face of the objections against leaving establishments of this nature without protection, repeat the evil in the open cantonment at Poona, however improbable may be the prospect of danger. It is one thing to recommend the retention of an arrangement that exists, is efficient, and in reality exposed to only the most distant risks; and another, to propose the removal of a factory to a position acknowledged to be objectionable, and which would, in troublous times, become a cause of serious embarrassment, necessitating the defence of two adjacent positions instead of one only. Under such considerations, it seems that if the gun-carriage factory be established there at all, it ought to be within the proposed fortified enclosure at Kirkee containing the other factories and ordnance establishments, and which is further required for purposes of a place of refuge, should circumstances render the open cantonment of Poona untenable.

See Statement B, appended.

It should also be urged that Poona or Kirkee enjoy very distinct advantages in its central position, and in the undoubted superiority of its climate over that of Madras in which to season timber, the lat-

ter is an advantage it is scarcely possible to estimate at a money value, as it is of first importance in securing the durability and efficiency of the equipments manufactured. Of such paramount importance has this point been considered, that the Government of Bombay, in anticipation of the sanction of that of India, permitted the removal of the timber, half-wrought material, and carpenter's branch, to Poona; and it is known that the same cause led to the removal many years ago of the Bengal gun-carriage factory from the presidency to Futtehghur.

It is believed that there would rather be economy in distribution of the out-turn from a factory established at Madras than from one located at Poona.

The statements of cost of building wrought-iron gun-carriages at the three factories have not been touched upon because they seem to have been framed upon different data, and therefore not useful for comparison. Judging from the details of material and labor, that from Futtehghur appears to show the cost of manufacture from the rough material, and not the making up of the carriage with the set of iron-work sent out from England, as apparently entered in the statements from Madras and Bombay; and in them the difference in the rates of the iron-work is not understood.

To sum up,—the determination of whether Kirkee or Madras shall be the site of the second gun-carriage, seems to depend almost entirely upon the one point of climate—that is, whether the unsuitability of that of Madras for seasoning timber is a consideration of sufficient importance to outweigh the advantages which the actual existence of an efficient factory ready to hand with good facilities of supply of material and labor offers. The importance of putting thoroughly seasoned timber into carriages intended for service in the destructive climate of India cannot be over-estimated, as their stability under every kind of trial from extremes of climate, roughness of roads and country traversed, and the violent shocks of discharge in firing, depends upon the complete fitness of the material at the time of construction.

## A.

*Supervising establishment and rates of labor wages.*

BENGAL.			MADRAS.			BOMBAY.		
	Rs.	A. P.		Rs.	A. P.		Rs.	A. P.
1 Engineer and Foreman ...	450	0 0	1 Mechanical Engineer ...	720	0 0	1 Foreman Fitter ...	500	0 0
1 Assistant ditto ...	250	0 0	1 Ditto ditto ...			1 Ditto Mechanic ...	200	0 0
1 Head Overseer Conductor, Stores ...	280	0 0	1 Store Sergeant ...	169	8 0	1 Head Overseer Conductor, ...	220	0 0
1 Assistant Overseer Sub-Conductor ...	155	0 0	2 Conductors ...	350	0 0	1 Store-keeper ...	150	0 0
1 Overseer Blacksmith ...	220	0 0	2 Sub-Conductors ...	270	0 0	1 Foreman Blacksmith ...	300	0 0
2 Sergeant Overseers ...	223	8 0	1 Sub-Overseer ...	40	0 0	1 Conductor ...	160	0 0
2 Assistant ditto ...	163	8 0	2 Sergeant Instructors ...	94	15 0	1 Sub-Conductor ...	125	0 0
						1 Master Artificers ...	162	6 0
TOTAL ...	1,742	0 0	TOTAL ...	1,644	7 0	TOTAL ...	1,817	6 0
Mistry Carpenter ...	25	0 0	Head Carpenter Mistry ...	35	0 0	Head Carpenter Mistry ...	60	0 0
Mate ditto ...	15	0 0	Carpenter Mistry ...	20	8 0	Carpenter Mistry, 1st class ...	45	0 0
Carpenter, 1st class ...	12	0 0	Carpenters of classes ...	14	0 0	Ditto ditto, 2nd ,, ...	40	0 0
Ditto, 2nd ,, ...	10	0 0	Carpenters, per diem 0-7-0 to 0 10 0			Carpenters, extra, p. d. 0-13-0 to 1 4 0		
Ditto, extra, per diem 0-1-0 to 0 7 3			Filer Mistry ...	24	0 0	Filer Mistry ...	40	0 0
Filer Mistry ...	20	0 0	Filers of classes ...	11	11 0	Filers, per diem 1-0-0 to 1 4 0		
Filemen, per diem 0-1-0 to 0 7 3			Head Smith Mistry ...	32	0 0	Mistry Smith ...	40	0 0
Mistry Smith ...	20	0 0	Smith Mistry ...	24	0 0	Smiths of classes, p. d. 1-4-0 to 1 6 0		
Mate ditto ...	12	0 0	Smiths of classes ...	14	1 0	Turner, 1st class, 42 + 8 annas a day working pay.		
Foremen or Smiths, pr. d. 0-1-6 to 0 7 0			Turner ...	13	0 0	Extra not shown.		
Turner ...	16	0 0	Ditto, extra, per diem 0-10-0 to 0 11 0			Lascar Sirdars ...	8	8 0
Ditto, extra, per diem ...	0	11 0	Conicopelly ...	17	8 0	Store Lascars ...		
Lascar Sirdars, extra ...	10	0 0	Coolie Lascars ...	7	0 0	Coolies ...		
Ditto, Store, 1st class ...	7	0 0	Coolies, per diem 0-3-0 to 0 4 0			Painters, per diem ...	0	14 0
„ 2nd ,, ...	6	0 0	Painters ...	10	4 0			
Painters, per diem 0-1-0 to 0 6 9								
OFFICE.								
5 Clerks ...	335	0 0	8 Clerks ...	315	0 0	13 Clerks ...	660	0 0
2 Servants ...	14	0 0	6 Servants ...	40	0 0	8 Servants ...	80	0 0
Annual ...	4,188	0 0	Annual ...	4,260	0 0	Annual and percentage ...	8,880	0 0

9th February 1875.

F. TURNER.

## B.

Table showing maximum and minimum Readings of Temperature and Humidity.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Maximum Thermometer	Poona ...	86·1	90·8	98·2	99·1	100·7	95·2	83	82·6	85·3	90·1	90	86·1
	Madras ...	84·9	86·8	89·2	92·7	97·4	98·5	96·2	93·9	93·3	88·9	84·1	84·3
Minimum Thermometer	Poona ...	55·8	57·4	63·8	70·2	72·8	70·3	70	69·1	68·7	64·4	64	54
	Madras ...	67·4	69·3	71·1	77·4	80·2	81·0	78·7	77·2	77·2	74·6	73·1	71·1
Maximum Humidity	Poona ...	·816	·803	·754	·743	·836	·883	·922	·921	·905	·830	·827	·725
	Madras ...	·89	·93	·92	·88	·80	·69	·73	·79	·81	·90	·90	·89
Minimum Humidity	Poona ...	·360	·353	·265	·263	·295	·566	·661	·646	·674	·335	·408	·401
	Madras ...	·52	·47	·43	·44	·36	·31	·35	·40	·38	·44	·47	·50

Highest temperature, Poona  
Lowest ditto ditto

100·7  
55·8 } Range 44·9; average 78·25.

Highest temperature, Madras  
Lowest ditto ditto

98·5  
67·4 } Range 31·1; average 82·95.

Maximum humidity, Poona  
Minimum ditto ditto

·922  
·263 } Range ·659; average ·592.

Maximum humidity, Madras  
Minimum ditto ditto

·93  
·31 } Range ·62; average ·62.

Temperature highest at Poona, except during four months, June, July, August, and September, during which period also there is great excess of humidity. During the remainder of the year the heat is greater and the humidity less. The climate of Poona during this time is much drier than Madras.

The average temperature of Madras exceeds that of Poona, but is more equable; the average humidity also is greater.

During four months (2nd to 5th) the *minimum* of humidity ranged at—

Allahabad	...	...	...	...	from ·28 to ·16.
Futtehghur	...	...	...	...	” ·20 ” ·06.
Poona	...	...	...	...	” ·35 ” ·26.
Madras	...	...	...	...	” ·47 ” ·31.

During the four dry months in the four years the humidity at—

Futtehghur	...	...	only once reached ·20, average being ·12.
Allahabad	...	...	” ” ·28, ” ” ·21.
Poona	...	...	” ” ·35, ” ” ·29.
Madras	...	...	” ” ·47, ” ” ·42.

From these figures it must be argued that Madras is a much damper climate than Poona, and that the dryness of the North-Western Provinces of India far exceeds what is experienced at either of these places.

9th February 1875.

F. TURNER,

*Minute by* COLONEL W. S. HATCH, R. A.

After hearing the Minute drawn up by the President, I think it desirable to limit my remarks on the comparative merits of Madras and Poona as sites for a gun-carriage factory to the questions of climate and cheapness, under which last head may be included the point so much insisted on *viz.* of the existence of a gun-carriage factory at Madras, while none exists at Kirkee or Poona.

*1st. Climate.*—Statistics show that Poona is superior: carriages put together there in the dry season will not shrink in any climate; while those put together in a damp, moist locality must necessarily not only shrink in a very dry climate, but be liable, equally with those built in a dry one, to be affected by a great excess of moisture if exposed to it. There appears, however, to be only a portion of the British territory, *viz.*, Burmah, (the station for one battery only,) where this is likely to be the case. Statistics also show that the Bombay Presidency is superior as regards the healthiness of European establishments: I observe in the return for 1873 that the mortality of European troops in the Madras Presidency was in that year 50 per cent. greater than that in Bombay.

*2nd. Cheapness of material.*—In the case of English stores, Madras now receives them at a slightly cheaper rate than Bombay, owing to the fact that the Bombay import trade is larger than its export trade, the reverse of which is the case at Calcutta; consequently many vessels come from England to Calcutta in ballast, and are glad to earn a little freight by taking stores to Madras. But can we fairly anticipate that this will always be the case? As our inland communications are improved, we may reasonably expect that produce for export will be attracted to Bombay as being the port nearest to England, and therefore its natural outlet. We may fairly calculate that outward freights will then find their natural level, *viz.*, become proportionate to the distance over which goods are conveyed. The freight to Bombay is also enhanced by the port charges, which there is reason to believe will ere long be reduced. Madras has an advantage in a cheap supply of Burmah timber; but this advantage has been much reduced by the use in gun-carriages of so large a proportion of iron, and by the fact that the price of Moulmein teak has lately risen considerably at Madras, so that the difference between its



cost and that of the southern teak procurable in Bombay is not so great as before. Also, should the chord line between the two branches of the Great Indian Peninsular be completed, a factory at Poona could be supplied with coal more cheaply than now.

*3rd. Labor.*—This is, undoubtedly, at present somewhat cheaper at Madras than at Poona. Owing to the position of Madras, but few factories have yet arisen to compete for labor with the Government establishments; but Madras cannot always remain in its present condition. Should competition arise by the establishment of factories, wages will rise at once. It has been urged that the Madras artificers being permanently engaged cannot strike for a rise of wages; but even in Madras men cannot live for ever, and it is certain that if wages should become generally higher elsewhere, new hands will not be found to bind themselves to serve for life at disadvantageous rates.

If, on the other hand, no factories should be established at Madras, while they are so elsewhere, skilled labor will be attracted thence, and the facility of increasing establishments in case of necessity will be even less than at present. The Commissary of Ordnance in Fort St. George, it may be remarked, states that the hired artificers procurable in Madras are much inferior to the fixed hands.

The advantage as regards cheapness of transport of field carriages to the stations, which either Madras or Poona would supply, is slightly in favor of Madras; but, on the other hand, we must recollect that demands for making and repairing heavy carriages and platforms for Bombay harbour defences and shipping are likely to be much larger in the direction of Bombay than in that of Madras, and that, consequently, if the gun-carriage factory be located in Madras, a heavy expense for carriage of those equipments will be increased. The Commission have already expressed an opinion to the effect that Bombay is the most suitable point for the embarkation of expeditions (westward and beyond sea) as in the case of those sent to Egypt, Persia, Abyssinia. In the event also of reinforcements being sent from England to the North-West *via* Kurrachee, a large portion of their equipments must be sent from Bombay; for the supply of troops in all these cases, Poona is far better situated than Madras.

We must also bear in mind that to enable the Madras factory to increase its out-

turn, considerable additions to its buildings are necessary, and that the removal of the gun-carriage factory from its present exposed site has been strongly urged by the Madras authorities; and that for the construction of a factory at Poona, a large sum will be available from the sale of the buildings at Bombay and of the land now occupied by the Superintendent's quarters and the factory office, and that many of the Poona arsenal buildings may be utilised for this purpose. The argument, that the collection of factories in one spot is unadvisable as a matter of policy, has been used as a ground of objection to Poona; but I would urge that a gun-carriage factory is one which affords material assistance to the others in the way of repairing old and making new machinery, and that, therefore, its location in juxtaposition to the other factories is a decided advantage. Taking all these facts into account, I think the supposed economy in retaining the Madras factory will be found to disappear, and that Poona is, on the grounds of economy, facility of supply, and climate, the more suitable site.

I find from Major Tulloch's report on the drainage of Madras, that the average annual rainfall for twenty years was 50 inches, and that this was spread over nine months of the year. That at Poona is, I know, 27 inches, and this is spread over only four months in the year.

W. S. HATCH.

The calculations made by Mr. Willson of the comparative average humidities of Calcutta, Madras, and Bombay, show that that of Madras, is but little less than those of the other two presidency towns.

Experience has shown that the climates of Calcutta and Bombay have been so detrimental to carriages built there, that the removal of the gun-carriage factories has become necessary, and we may reasonably urge that the climate of Madras must be nearly as much so, and on this ground I think it unsuitable for the site of a gun-carriage factory.

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*Minute by COLONEL A. STEWART on the question as to whether the second Gun-carriage Factory for India should be at Madras or Poona.*

At Madras there is already a gun-carriage factory in full working order,

capable, at a comparatively small expense, of being increased to any extent which may possibly be required in the event of only two factories being maintained for the supply of the army in India.

2. For such increase, a piece of ground adjoining the factory, and separated from it by the factory wall, is available, and is the property of Government. This ground is at present used as a parade-ground for the Native Infantry regiment quartered in Vepery; but I understand that the removal of this corps to another site has been already sanctioned by Government.

3. The factory occupies an area of 11 acres 2 roods 16 perches, and the adjoining available area is 6 acres 2 roods, giving a total of upwards of 18 acres; and the termini of the Madras and Carnatic Railways, including both passengers, and goods' stations, are within half a mile of the factory gates.

4. There are nearly 100 machines of sorts, in good working condition, from the large break-lathe taking 30 feet shafts and capable of bearing 8 tons on its face-plate, to the small patent bolt screwing machine; and the factory can turn out a field battery complete, per mensem, with the new W. I. carriages.

5. The Carnatic Ordnance Artificer Company, established since 1821, are excellent workmen, taught from boyhood by Government the trades they follow as men; and their value has been proved by the numerous applications made by other departments for their services. Several of them are, even now, employed as overseers of the more unskilled native workmen in the gun-carriage factory at Futtehgurh, and others are employed in the revenue survey and other departments of the State. The corps opens a good and respectable means of livelihood to the sons of European soldiers and of the Eurasian population: they are very cheap workmen, in reference to their attainments and skill, whilst in troublous times their sympathies would be with us; and as they are already enrolled as volunteers in the Madras Volunteer Guards, and armed with and drilled to the use of breech-loading weapons, they would form a valuable auxiliary body for the defence of the factory when required. They follow the trades of armourers, smiths, turners, brass-founders, and carpenters; and there are always 30 pupils under instruction, with school-room and all requisite appliances already in existence. Their homes are in the immediate vicinity of the factory; and as this is situated in the

cheapest part of Madras, it is a matter of some consideration in dealing with the question now before the Commission.

6. Again, the proximity of the factory to the seaboard enables sea-borne coal to be obtained, as it were, from the ship's side, instead of having its price about doubled by the cost of land transport, as would be the case were the factory at Poona.

7. Woods in use for the construction of gun-carriages, such as teak, saul, and sissoo, have been obtained at Rs. 80 per ton in the Madras factory; and although prices have been and are rising, assuredly the rise will affect other places also; and, *cæteris paribus*, from its position Madras will still be the cheaper place for the supply.

8. There are also saw-mills on the premises, for conversion of timber to ensure economical transport to out-station arsenals and depôts.

9. Until a race of contractors springs up in Madras, the abolition of the factory would paralyze the ordnance establishments of the Presidency to a considerable extent; for, with the exception of the railway workshops, there does not exist an establishment where jobs, such as turning naves and axletrees, and other heavy artillery work, can be undertaken at all. There is hardly any machinery elsewhere in Madras, nor any firm likely to start workshops on a large scale; and even were such workshops contemplated, the higher rates of wages that would be demanded by free skilled workmen, if available, would render their success doubtful.

9a. Skilled labor equal to that of the majority of the Carnatic Ordnance Artificer Company is not procurable in Madras; many of the men composing it knew at least two trades; some more than two. The Superintendent of Gun Carriage Factory estimates the rates at which these men could obtain employment elsewhere at little, if anything, under Rs. 100 a month. Their services have sometimes been lent for an hour or more to start a machine, or advise on a point of speed, gearing, or other mechanical question, when the remuneration offered has been over Rs. 5 a day. Their pay from Government is as follows:—

Rs. 15 under 7 years' service.

„ 20 between 7 and 14 years' service.

„ 25 after 14 years, with family allowance for the married men at Rs. 3-8 for wives and Rs. 2-8 for each child. They receive no rations, even in Burmah.

The pupils are fed and get their washing at 4 annas and 10 pie a day, and they each receive Rs. 2 pocket money per month, from Government. The foremen receive pay as below :—

1st Class, Rs. 55	} after 14 years' services.
2nd „ „ 45	
3rd „ „ 40	

and the corps has certain advantages in regard of pension on discharge, the maximum being two-thirds of artificer's pay, after 22 years' service, if declared unfit for further work.

10. There is a good substantial wall all round the factory, which only requires to be loop-holed and to have some flanking defence thrown up, to make it an admirable protection against insurrectionary attack. This is an important advantage; for I see it stated in the marginal letter,\* that “a plain solid masonry enclosure wall of only 12 or 15 feet in height, average thickness 4 feet, measuring 4,500 feet in length, \* \* \* , loop-holed and with banquette for musketry fire, would cost nearly £10,000. This is at Rawul Pindee.”

\* No. 2041 of 28th April 1873, from the Inspector-General of Military Works, to Secretary to Government of India, Public Works Department.

11. The delay and expense to Government which would be attendant on breaking up the Madras factory and making a new one at Poona would be very great, and far exceed the amount which would be required for enlarging the former on its present site.

12. After completion of our reserves for the Field Artillery, the principal carriage work for some years to come will be the provision of iron heavy gun-carriages for coast defences, as at Bombay, Kurra-chee, Calcutta, Madras, and Rangoon; and for this purpose the Madras factory, being itself on the seaboard, with freights costing less than to Bombay, possesses considerable advantages over Poona, which is 120 miles inland, over an expensive line of railway, with heavy additional charges for transit up the ghats, whilst Madras is nearer to Calcutta and Rangoon.

13. Labor and material, the most important elements in the calculations affecting an establishment of this nature, are both cheaper at Madras than at Poona; and the facilities for distribution of the out-turn to arsenals, provided there be a factory in existence at Allahabad, are also in favor of Madras.

14. The difference of climate between the two places under consideration, as affecting the question of seasoning timber, is not, so far as I can gather from the meteorological reports furnished to the

Commission, very much in favor of one place over the other. The practical fact, however, remains, that gun-carriages made at Madras have been in use all over India and Burmah, and have lasted well a fair average time.

15. The yearly total of maxima, minima, and average of humidity, are as follow:—

		Maxima.	Minima.	Average.
Poona	...	9.965	5.227	7.621
Madras	...	10.130	5.070	7.600

The mean rainfall at Madras during the years 1871, 1872, and 1873, was as follows:—

1871...	56.35 inches	} average 60.62 inches.
1872...	73.67 „	
1873...	51.83 „	

But the year 1872 was quite exceptional, as there were unusually heavy rains in the months of October and November of that year: thus—

October, 18.48 inches } mean 23.73 inches, due to those 2 months alone.  
November, 28.98 „ }

The corresponding rainfall in those two months for the other two years of the series being—

1871, Oct.,	6.21 inches;	Nov.,	26.41;	mean	16.31 inches.
1873, „	10.61 „	„	13.51;	„	12.06 „
					28.37s. inches.

or a mean for those two years of only 14.185 inches.

16. The average rainfall at Calcutta for twenty years, from 1839 to 1858, as given in Beardmore's Manual of Hydrology, page 330, was 66.89 inches.

That of Madras, also on a twenty years' average, is stated to be about 50 inches; *vide* page 33 of an Abridgment of Report by Major Tulloh, R. E., on the drainage of Madras, published in professional papers of Indian Engineering, Section G.

17. The population of Madras is eminently peaceful and loyal: and, in a country like India, it is as well to have "*our ship built in compartments*," as Lord Ellenborough happily expressed it. The following statements will show the present and proposed distribution of our factories from this point of view:—

*Present distribution of Ordnance Factories in India.*

PRESIDENCY.	G. R. F.	G. C. F.	S. A. A. F.	S. F.	H. and S. F.	Total.	REMARKS.
Bengal ...	1	1	1	1	1	5	
Madras ...	1	1	...	...	...	2	
Bombay ...	1	1	1	...	...	3	
TOTAL ...	3	3	2	1	1	10	

*Future distribution of the Factories, if the Madras Gun-carriage Factory be retained, and that at Bombay abolished.*

PRESIDENCY.	G. P. F.	G. C. F.	S. A. A. F.	S. F.	H. and S. F.	Total.	REMARKS.
Bengal ...	1	1	1	1	1	5	
Madras ...	1	1	...	...	...	2	
Bombay ...	1	...	1	...	...	2	
TOTAL ...	3	2	2	1	1	9	

*Future distribution, if Madras Factory be abolished and a new Factory made at Poona.*

PRESIDENCY.	G. P. F.	G. C. F.	S. A. A. F.	S. F.	H. and S. F.	Total.	REMARKS.
Bengal ...	1	1	1	1	1	5	
Madras ...	1	...	...	...	...	1	
Bombay ...	1	1	1	1	...	3	
TOTAL ...	3	2	2	1	1	9	

18. It is, I believe, an admitted principle with the Commission generally, that India should be made as self-supporting as possible; and in this view, with reference to the probable increase in the quantity and value of both iron and coal eventually obtainable in India itself, it would appear that gun-carriages, especially for heavy ordnance, might in the end be entirely and more cheaply constructed in our carriage factories, instead of being, as at present, only put together from English made up materials. The relative prices of the above materials would, in that case, probably turn in favor of Poona, as the districts in which they are to be found are nearer to that place than to Madras.

19. I think it would be advisable to obtain, if possible, a professional opinion as to the respective advantages, or otherwise, of an equable, warm, and somewhat moist climate, such as is to be found in Madras, and of one with great extremes of heat and damp, such as that of Futteh-gurb, for seasoning wood required to be subsequently exposed to extremes of both dryness and damp: and which of the two woods, so seasoned at each place, would be most likely to stand such extremes.

20. Since writing the above, I have had the opportunity of reading the report of Mr. Willson, Meteorological Reporter to Government, on certain statistics submitted to him by the Commission, and I observe that he states as follows: "On

the whole year, Madras is drier than Calcutta, and Calcutta slightly drier than Bombay. At Bombay the humidity is more equable throughout the year than at Calcutta, where the months February March and April are drier than the same months at the former place.

The winter months at Bombay are, however, slightly drier than the same period in Calcutta. In May, June, July, August and September, Madras is much drier than Bombay or Calcutta; but the humidity is greater at Madras in most of the remaining months of the year than at Bombay or Calcutta."

21. So much for the respective climates; but, as a practical fact, I am prepared to state, from an experience of Madras gun-carriages extending from 1841 to the present date, that they have done their work admirably, that repairs required have been, as a general rule, of the most ordinary nature; and that the time they have lasted has been a good average time, which will bear comparison with that of similar carriages constructed elsewhere.

9th February 1875.

ALEX. STEWART.

The following resolution was proposed by Mr. Haliburton and read by the President:—

"The Commission have heard the Minute prepared by the President, on the subject of the gun-carriage agencies in India, and concur generally in the view therein expressed, that two gun-carriage factories are sufficient for the requirements of the army in India. They have also freely discussed the question whether the existing factories at Bombay and Madras shall be abolished, and a new one be established at Kirkee or Poona; or, whether the Bombay factory shall be abolished and that at Madras retained. They find—

1. That all important supplies consumed in the factory would cost considerably more at Poona than at Madras. This results from the fact that sea freight from England to Madras is about Rs. 1-10-4 lower than to Bombay; while to the latter freight would have to be added Rs. 17 a ton for forwarding charge from Bombay to the factory at Poona. The weight of coals, iron and timber alone would probably not be less than 500 tons a year. Omitting the difference in sea freight, which might in time cease, the extra cost on the three items of supply above mentioned would not be less than Rs. 8,500 per annum.



2. That labor generally is cheaper at Madras than at Bombay.

3. That in the distribution of the factory out-turn to arsenals and depôts, assuming the second factory to be placed at Allahabad, Madras, in an economical point of view, would have a slight advantage over Poona.

4. That Madras has a good working factory, which could, by the expenditure of not more than one lakh of rupees, receive the extension which an increased demand on it might necessitate; while the factory, though not in a perfectly safe site, is sufficiently safe to render its destruction by an enemy a contingency of doubtful probability.

4. That while the south of India has no large Government establishment capable of performing work similar to that performed in the gun-carriage factory of Madras, there exists in Bombay a large Government dockyard capable at any time of undertaking works of a heavy character required in the west of India for the Ordnance Department; to this extent, therefore, the factory in the west can be better spared than that in the south of India.

6. That the cost of removing the existing plant and stores from Bombay to Poona would not be less than half a lakh of rupees, while to build a new factory at Kirkee would cost at least  $6\frac{1}{2}$  lakhs; and to convert the Poona arsenal—a site not free from military objections—into a gun-carriage factory, would cost about Rs. 1,32,000.

Assuming the capitalized value at 4 per cent. of the extra annual cost referred to in paragraphs 1, 2, 3, to be  $2\frac{1}{2}$  lakhs, the financial effect of the different courses herein considered would be as follows:—

	Rs.	Rs.
Cost of retaining and extending Madras factory ...		1,00,000
Cost of removing Bombay factory to new site at Kirkee ...	7,00,000	
Capitalized value of extra cost of material, transport, and labor at Poona ...	2,50,000	
	<hr/>	9,50,000
Cost of removing Bombay factory to Poona arsenal ...	1,82,000	
Capitalized value of extra cost of material, transport, and labor ...	2,50,000	
	<hr/>	4,32,000

The proposal to remove the factory to Poona would, therefore, apparently cost Rs. 3,32,000, or Rs. 8,50,000, according to the site selected more than would be incurred by its retention and extension at Madras. Financially, therefore, the advantages are in favor of Madras, and it is only a question of whether the climate

of Poona offers such advantages over that of Madras for the purpose of seasoning timber as to justify the Commission in recommending that the expense and inconvenience which would be entailed by a removal to Poona should be incurred.

The Commission, though they have taken the opinions of numerous officers of artillery, have been unable to obtain from them any direct evidence to prove that gun-carriages made at Madras have become unserviceable or inefficient owing to the use of ill-seasoned timber.

As at present advised, therefore, the Commission recommend that the Bombay factory be closed, and that the Madras establishment be retained. They would further recommend that gun-carriages manufactured in Madras should be sent to stations in Central India and North-West India for the purpose of testing their durability when exposed to the effects of extremely hot and dry climates. These carriages should be placed in batteries with Futtehghurh carriages, and a careful record made of the nature, extent and cost of the repairs required by both sites of carriages in a given period, in order that their comparative durability and strength may be ascertained.

Should these experiments prove that the maintenance of the factory of Madras is incompatible with the efficient supply of gun-carriages to the army, it will then be in the power of Government to close it and build another at Poona or elsewhere. This delay will entail no increased expense, while it will defer a considerable expenditure which may prove to be unnecessary."

The following amendment was proposed by Colonel Hatch and read by the President :—

The Commission after considering the various points raised in the Minutes that have been read, and the subject generally, are of opinion that the maintenance of two gun-carriage factories in India is necessary, but that a third is not required. They adhere to the opinion expressed in their report, that one of these factories should be at Allahabad.

As to the second, the Commission consider that although Madras possesses at present certain advantages in cheapness of labor and material, and in the existence of a factory, yet that Poona, owing to its superiority in climate and geographical position, is on the whole the more suitable site; and they recommend that the second gun-carriage factory should be established

at that station in the buildings now occupied by the arsenal, with suitable additions.

On the amendment being put to the vote—

Lieutenant-Colonel MacGregor voted against the amendment.

Mr. Haliburton voted against the amendment.

Colonel Stewart voted against the amendment.

Major-General Turner voted for the amendment.

The original resolution was therefore carried.

The following decisions were ordered to be recorded on the executive work of arsenals, &c., and to be embodied in the report:—

Transport arrangements are effected by the Commissariat Department in Bombay and Madras, and in Bengal by the Ordnance Department.

In Bombay the stores are packed and addressed for despatch, and intimation given to the Commissariat Department, which removes the packages from the arsenal premises and sends them to their destination. In Bombay the stores arriving by sea are landed by the Commissariat Department and delivered, in the case of the arsenal, in boats at the arsenal quay and lifted by the ordnance establishment; in all other instances the Commissariat Department delivers the stores within the several ordnance establishments.

In Madras the stores are packed and addressed for despatch, and intimation given to the Commissariat Department which removes the packages from the arsenal and sends them to their destination by inland transport. Stores arriving from England by sea are landed by the Ordnance Department; all despatches from port to port being effected by the Commissariat, the boats being supplied by the Master Attendant.

In Bengal the stores are packed and sent under ordnance charge to the rail and bullock train offices, and despatched by the Ordnance Department.

The receipt and issue of all stores by ship are effected by the Ordnance Department.

The Commission lay down the principle that as the Commissariat Department provides the transport of the army, that department should undertake all duties connected with the receipt and despatch of

stores into and from arsenals and the Ordnance Department, and of such stores as have hitherto been landed by the Ordnance Department for other departments.

#### INDENTS.

Requisitions in the Madras Presidency are sent to the Commissary of Ordnance in charge of the arsenals on which the troops are dependent. In the case of authorized supplies, he checks and acts on the indent, transmitting it to the Office of the Examiner of Ordnance Accounts. Indents other than for authorized supplies are sent, before being dealt with, to the Ordnance Office, Madras, and sanctioned, or not, as the case may be, by the Inspector-General of Ordnance. Emergent indents are acted on under the signature of the General or other Officer commanding the division or station.

In the Bombay Presidency all indents are sent to Commissaries of Ordnance, who examine and send them to the Inspector-General of Ordnance for sanction, except emergent indents, which are dealt with as above.

In Bengal all indents (except emergent) are sent, in the first instance, to the Ordnance Office, where they are checked and sanctioned before transmission to the arsenal for compliance.

The Commission lay down the following principles :—

1. That there should be printed equipment tables showing the number and periods of service of all stores forming the equipment of the several corps of the army.

2. That the demand for stores should be put forward by corps twice a year in the spring for service ammunition, and in the spring and autumn for stores to complete or repair equipment.

3. That indents for authorized stores should be sent direct by corps to Commissaries of Ordnance in charge of Arsenals whose duty it will be, after check by the equipment table, to issue the stores.

4. Emergent indents to be dealt with as heretofore.

#### CONDEMNATION OF STORES.

5. The system of regimental condemnation should be entirely abolished, and all stores on which report is required submitted to garrison boards of experienced officers, and when practicable, the services of an ordnance officer on such boards obtained.

6. The period of service is the time which stores shall be required to be kept

in use, but should never be made the reason for condemnation, which must depend only on the fitness of the stores for further use.

7. Stores are never to be refused on account of the pattern being obsolete, or of quality being inferior; in the latter case, they are to be issued on the responsibility of the Commissary of Ordnance, and brought into use for such periods as they may continue serviceable—a garrison board recording their condition for the protection of the corps.

#### CONTRACT SYSTEM.

The Bombay Ordnance Department makes contract for rates and takes the quantity required.

The Madras Ordnance Department makes contracts for quantities.

The Bengal Ordnance Department makes contracts for definite quantities. Bombay and Madras pay contractors' bills directly. Bengal pays by cheque on the Commissariat Department.

- 1.—We recommend that the purchase of stores locally should be regulated as to quantities by estimates based on averages of the previous five years' expenditure.
- 2.—That the contracts should be made in definite quantities and the bills paid in the Ordnance Department.
- 3.—That contracts should provide for any excess quantities of particular stores at the specified rates, if required.

#### ISSUE OF STORES.

The system of issuing stores from arsenals, and the responsibility, should rest with the Commissary of Ordnance in the first instance, and directly on the Permanent Conductor of Issues, whose business it must be to see that indents receive prompt compliance.

#### PERMANENT AND EXTRA ESTABLISHMENTS.

The system of extra establishment, as practised in the Bengal and Bombay arsenals and depôts, to supplement the permanent establishment and in factories as the main source of labor, should be considered the authorized system throughout India, and should be carried out as circumstances render feasible. The corps of Carnatic artificers attached to the Madras gun-carriage factory is an exceptional body, and must be looked upon as special. regard them as an efficient and useful class of men for whom it is desirable

to provide employment ; they are good workmen, and their usefulness is much extended by their ability to undertake the duties of supervision of labour.

#### RETURNS, &c., IN MADRAS AND BOMBAY.

Monthly returns of receipts, issues, and remains of stores in which there have been transactions, together with an annual list of remains of all stores, are rendered to the Examiner. In Bengal the monthly returns of receipts and issues, and ledger annually are rendered.

The systems pursued in Madras and Bombay throw much additional work on the arsenal offices, which have to furnish the monthly returns of receipts and issues, and keep up ledgers. A list of remains of stores, in which there have been transactions, is included in the monthly returns of receipts and issues sent to the Examiner, and annually a list of remains of all stores, which forms the document in which the ledger account is kept up in the Examiner's office, thus throwing additional work on the executive officers ; of this work they should be relieved. In Bengal the monthly returns are furnished, and the complete ledger is sent at the end of the year to the Examiner, the section ledgers of store-holders then becoming the ledger of the arsenal office. If the Examiner keeps a ledger posted from the monthly returns, the balance only at the end of the year will need comparison, and any discrepancies discovered will readily be brought to light. The monthly check over "remains" does not appear essentially necessary to an efficient practical audit and to due protection of the interests of Government. They recommend that the system followed in Bengal be introduced throughout the arsenals and depôts of the three Ordnance Departments.

#### REPAIRS IN ARSENALS FOR REGIMENTS AND BATTERIES.

More repairs are effected in the arsenals of the Madras and Bombay Presidencies for regiments and batteries than are found to be necessary in Bengal, occasioning much additional work in every branch of arsenal establishment and detracting from regimental efficiency, which in this respect depends upon the ability to maintain equipments in serviceable condition under all circumstances of service. The proportions of stores sanctioned, and the regimental organization, provide the means of effecting all repairs ; and commanding

officers should be held responsible that the stores are in possession, and the regimental establishments effective. We consider that this should be strongly insisted upon.

#### UNSERVICEABLE STORES.

The systems in the presidencies differ. In Madras and Bombay condemned stores returned into arsenals cannot be disposed of without the particular sanction of the head of the department for each article of store. In Bengal these stores are disposed of under standing departmental orders. This is considered the proper system, as no store can be on the books of an arsenal as "unserviceable," except under competent authority. In the case of a store in arsenal stock being unserviceable from deterioration or other cause, its transfer to the "repairable" or "unserviceable" column of the ledger should only be effected under direct authority of the head of the department.

The Commission consider that no officer or subordinate should have any interest or concern whatever in the disposal, or sale, or even purchase, of unserviceable stores, and their sale should be effected by a public auctioneer on terms specified in the call for tenders.

#### BARRACK FURNITURE—SUPPLY OF STORES TO OTHER DEPARTMENTS.

The supply in the Bombay Presidency devolves upon the Ordnance Department, with the exception that where there are no arsenals, supply is contracted for, and repairs effected by, the Commissariat Department. Similarly, in the Madras Presidency, the Ordnance Department furnishes stores to civil departments, to jails, a few articles for the Public Works Department, as riding schools and gymnasia fixtures, and soldiers' boxes to Barrack Department. These duties enhance the work of arsenal establishments, and will not be practicable should the reduction advised in their report be carried out. The Commission therefore recommend that the system prevailing in Bengal be introduced into the other Presidencies; and G. G. O. No. 303 of 21st March 1872, which hitherto has been held in abeyance, should be made applicable to all India.

The Commission adjourned till 12 noon on the 11th instant, when it was decided to discuss the question of the system of supply of camp equipage and ammunition to the army.

*Minute No. 130, dated 11th Feb, 1875.*

The Commission met at 12 noon. Minute No. 129 of 9th February 1875 was read and confirmed. The system of supply of camp equipage was discussed. The Commission adjourned at 5 p. m. until 12 noon on the 12th instant, when it was decided to continue the discussion.



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The Commission met at 12 noon. Minute *Minute No. 131, dated 12th Feb. 1875.* No. 130 of 11th February 1875 was read and confirmed. The discussion on camp equipage was continued. It was decided that February, the 13th instant, should be occupied in the work of the sub-committee. Adjourned at 4-30 P. M. until the 15th instant, when it was decided to continue the discussion and to take up the question of small-arm ammunition.



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*Minute No. 132, dated 15th Feb. 1875.*

The Commission met at 12 noon. Colonel Stewart, R. A., absent through sickness. Minute No. 131 of 12th February 1875 was read and confirmed.

The question regarding the system of supply, &c., of camp equipage was discussed, and general recommendations drawn up for further elaboration and discussion.

Proof of Memorandum by Colonel Crommelin, C.B., R. E., obtained unofficially from Public Works Department, on the position of Khundwa as an arsenal site, was read and discussed.

The following resolution was proposed by the President :—

“Colonel Crommelin’s report on the position of Khundwa having been read and discussed, it is proposed that Government be recommended to take into formal consideration the advisability of locating a second class arsenal in that locality, and causing the ground to be carefully examined and report made as to its fitness from a sanitary point of view, pending which no expenditure should be incurred on the Mhow arsenal beyond what is absolutely necessary for its temporary maintenance.”

The following amendment was proposed by Lieutenant-Colonel MacGregor :—

“As Colonel Crommelin’s report on Khundwa shows that there is no site at that place which has very decided advantages, the Commission would recommend that Government should cause a thorough investigation by a Committee for the best site for an arsenal in Central India to be made :”—

The amendment was put to the vote.

Mr. Haliburton voted against the amendment.

Colonel Hatch voted against it.

Major-General Turner voted against it.

The amendment was therefore lost and the original resolution carried.

The papers were sent to Colonel Stewart, who agreed with the Resolution.

The following resolutions on—(1), system of supply of small-arm ammunition ; (2), on communications, railways, and defences of arsenals, &c., were read by Lieutenant-Colonel MacGregor. No. 1 was reserved for further discussion. No. 2, a general concurrence in the views therein held, was ordered to be recorded.

#### SMALL-ARM AMMUNITION.

The Commission are of opinion that the reserves of small-arm ammunition for the army in India should be calculated

according to the probability of their being required, and that they should be divided into three portions :—

1.—The service ammunition which should be in possession of the regiment at single station, and in larger cantonments, should be kept in a central station ammunition depôt, and where possible, in a fort under guard of British soldiers.

2.—Field reserve, which should be kept at the arsenal or depôt from which troops ordinarily draw their supplies of ammunition.

3.—Grand reserve of the whole army, which should be kept at the first class arsenals, as Fort William, Allahabad, Ferozepore, Bombay, and Madras.

With reference to the first, that a service complement of 200 rounds per man should be kept up at each station in Sind, Punjab, North-Western Provinces, Central India, Eastern Frontier, Bombay, Aden, Burmah, and north\* of Madras, and that a complement of 100 rounds per man will suffice for the remaining stations of Bengal and Madras.

2. The field reserve of the troops in the Punjab, Sind, Eastern Frontier, Burmah and Aden, should consist of 200 rounds per man, and for the rest of India 100 rounds will be sufficient.

3. The grand reserve of the whole army should consist of 200 rounds per man.

Kirki can make	34,000	ball	Snider	Cartridge	per	diem.
Dum-Dum	74,000					
	108,000					

Looking to the fact that the existing factories cannot supply the reserves for a number of years, the Commission would recommend that this shall be procured from England.

#### DEFENCES.

Having thus laid down the positions which they consider best for the arsenals and depôts in India, the Commission are averse to leaving this subject without prominently bringing to notice the unprotected state of some of them, and recording their earnest recommendation that early measures be undertaken for the provision of such defensive works as the positions of each seem to require.

They are of opinion that all the arsenals on which we must depend upon for resources of warlike stores in time of war should be fortified on such a plan as would enable them to stand a siege of moderate intensity, while all the factories

\* Secunderabad.  
Bellary.

and depôts should be placed beyond the danger of successful attack by an insurrectionary force with more or less military cohesion.

The arsenal at Allahabad seems to answer the above requirements, and it is not necessary to do more than call attention to the important part which the fact of its being properly fortified enabled it to play in the mutiny war of 1857,—a part which Lord Sandhurst has declared to entitle it to be called the real saviour of India. If Allahabad had fallen, there would have been no available ordnance stores nearer than Ferozepore on the one hand, and Calcutta on the other ; the equipment of the siege of Lucknow would not have been available, and the suppression of the rebellion might have been indefinitely prolonged.

Calcutta and Bombay being the principal arsenals of India, which should be looked to first, require much more to be done to them before Government can be entitled to view their position with anything like confidence. It is understood that schemes for the defence of both have been submitted, and the Commission earnestly beg they may receive the early attention of Government, with a view to their completion before the outbreak of war makes it too late.

The position of Madras having been considered absolutely unsuited to that of an arsenal, owing to the impracticability of defending it from the sea, it has become necessary to remove it ; and the Commission are of opinion, looking to the suddenness with which a war with a naval power might break out, that this should be done with as little delay as is compatible with its removal to the best site.

The arsenals at Aden, Rawul Pindi, Bellary, in Nimar, and in lieu of Ferozepore, should, with as little delay as possible, be placed in such a state of defence as will enable them to stand a siege.

The depôts of Peshawur, Mooltan, Agra, and Nagpore, are sufficiently defended ; but those at Kurrachee, Rangoon, Ahmedabad, Poona, and Bangalore require to be made secure.

#### COMMUNICATIONS.

In considering the best positions for arsenals and the area of supply which they should embrace, the state of the communications between the various military stations and the ordnance establishments have been prominently brought to the notice of the Commission ; and as these form an important consideration from a

military point of view, and have to a considerable extent influenced their recommendations, the Commission wish to record a few remarks on this subject.

The Commission have stated their opinion that ordnance establishments should be placed as far as possible on main lines of communications; and by adhering to this rule, and taking into account the improvements in these communications, they have been enabled to recommend a considerable reduction in the number of arsenals and depôts.

But it is evident, to enable their proposals to stand the test of war, that each military station should be in communication by good roads or by railway, or in some cases by both, with the arsenal from which it draws its warlike stores.

They would, therefore, call attention to the state of the roads between the following stations and the nearest points on the main lines of communication, which seem to require some improvement :—

<i>Station.</i>		<i>Nearest point.</i>
Jacobabad	...	Sakar.
Rajaupur	...	} Multan.
Dera Ghazi	...	
Dera Ishmail	...	
Dera Ishmail	...	Lahor.
Kohat	...	} Rawal Pindi.
Banu	...	
Segouli	...	Bankipur.
Darjeeling	...	Sahibgunj.
Buxa	...	Dubri.
Banda	...	} Fatehpur.
Nowgong	...	
Saugor	...	Kareli.
Jhansi	...	Gwalior.
Cannanor	...	Calicut.

The lines of railway which are of military importance, either not yet constructed or begun, though proposed, the following should be mentioned :—

Multan to Kotri.  
 Lahor to Peshawar.  
 Ajmir to Mhow or Ahmedabad.  
 Manmar to Patas.  
 Bareilly to Moradabad and Saharanpur.

The roads which the Commission consider should be kept up as alternative lines, in the event of the railway communication becoming interrupted, are—

Bombay to Mhow.  
 Poona to Bombay.  
 „ to Nasik.  
 „ to Ahmadnager, Aurangabad, and  
 Gulbarga to Haidarabad.  
 Gooty to ditto.  
 Musulipatam to ditto.  
 Madras to Bangalor.  
 „ to Gooty.

Bangalore to Belari.  
Jabalpur to Nagpur.  
Mhow to Agra.  
Wellington to Coimbatore.  
The Grand Trunk Road.

This resolution having been generally  
concurred in, was adopted.

The Commission adjourned at 4-30 P. M.



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The Commission met at 12 noon.

*Minute No. 133, dated 22nd Feb. 1875.*

Minute No. 132 of 15th February 1875 was read and confirmed.

The Commission discussed the papers laid before them by the Sub-Committee in executive works in arsenals and "establishments."

The former portion was adopted.

*Memorandum on the financial effect of removing Ferozepore arsenal to the main line of communication submitted by Mr. Haliburton, read and adopted as follows:—*

Apart from the strategical reasons which induce the Commission to recommend the removal of the Ferozepore Arsenal to another site, they are convinced that, on economical grounds, its removal will prove to be advantageous to Government.

In dealing with this subject, it is necessary to consider not only what the arsenal has already cost, but what expenditure must still be incurred before it can be made efficient for the purposes which it is intended to serve.

Ferozepore Arsenal is one of the first magnitude, being the immediate base for the supply of warlike stores to, and the depôt of the reserves for, a force of 40,000 men scattered over the most important frontier of India. In times of peace, the exact position of the arsenal which supplies these troops is not, except on economical grounds, of very great moment; but in the event of a war of any magnitude, time becomes of the very first importance, and it is then of vital necessity that the reserves of stores should be brought into the most rapid and convenient communication with the armies dependent upon them.

Owing to the development of the railway system in India, the comparative isolation of Ferozepore has become more complete. All stores sent to it have to quit the main lines of railway either at Raiwind or Loodiana, distant respectively about 38 and 76 miles, and on issue they have, before rejoining the main lines of rail, to retrace these distances, or be sent across the Sutlej to Lahore, distant 52 miles. During peace much of this road transport is effected by siege train bullocks, but during war there would be required for the field, and just at the moment of greatest pressure, the ordinary means of keeping open the communications between the arsenal and the railway would be completely destroyed,—a circumstance which

might lead to grave complications, as we should be obliged to create and depend on a local transport to convey stores to Lahore when the Sutlej was passable, and to Loodiana at other seasons. Under the most favourable circumstances, our main local reserve of stores would be five or seven days' journey from our railway communications, and the result would be that, although Ferozepore is so far to the North-West, stores could be sent from Allahabad to the front more rapidly than from Ferozepore, which is specially maintained for this service.

In the event of war necessitating the withdrawal of the Government transport for field service, it may be safely assumed that this severance of the base of supplies from the main lines of communication would not be permitted to continue, and that one of the first measures which Government would be forced to adopt would be the construction of a branch line of railway from Loodiana or thereabouts to Ferozepore. This measure, if adopted, would in a supply point of view only mitigate, not remedy, the defects of the position. All stores required for the field would then have to be taken back 76 miles to the main line of rail in a direction opposite to that in which they would be required. It would be impossible to think of a rail to Lahore, the direct route from Ferozepore to the North-West Frontier, as to bridge the Sutlej would entail an expenditure which Government would probably not even contemplate. Under the most advantageous circumstances, a line of railway from Loodiana to Ferozepore would probably not cost less than £5,000 a mile, and if built in a time of pressure, the cost would no doubt much exceed that sum. There is no reasonable probability that this line would ever pay as a commercial undertaking, and it may be safely estimated that the whole of the working expenses, equal to 2 per cent. on the capital, would have to be borne by the Government.

The financial effect of retaining the arsenal at Ferozepore during peace and war, instead of removing it to Umballa or to some other site on the main line of communication, appears to be as follows:—

Annual extra cost for cartage of stores to and from the main line of railway and Ferozepore, and extra cost of sending stores by rail from Umballa to Loodiana (for Ferozepore) and back again on issue to troop in Sirhind and Meerut Divisions			...	...	£ 6,000
Capitalised value of this sum at 4 per cent.			...	...	£ 150,000



Cost of constructing line of rail from Loodiana to Ferozepore, at £ 5,000 a mile ... ..	£ 380,000
Value at 4 per cent. of annual charge on Government for working expenses at 2 per cent. on capital ...	£ 190,000
	<hr/> £ 570,000

It may be pointed out that the great bulk of the local supplies required for Ferozepore Arsenal are drawn from the districts surrounding Delhi, and a very considerable reduction in their cost should result from the arsenal being moved to a more accessible site.

If the course now recommended be adopted, the isolated garrison of Ferozepore could probably be much reduced. In that event, the annual saving of £6,000 on cartage would be largely increased, as that sum represents the cost of conveying ordnance stores only, and is exclusive of expenditure on Commissariat, Regimental and Public Works Department transport.

In view of these facts, therefore, the Commission consider that the following would be the advantages gained by drawing this arsenal back from its present isolated position and locating it on the main line of communication between the seaboard and the North-West.

1st.—In time of peace Government would not incur any loss, as the capitalised value of the extra annual expenditure which its present position entails would amply cover the cost of its removal.

2nd.—In the event of a war of any magnitude, Government would escape the outlay which would be forced upon it for the construction and maintenance of railway communication between Ferozepore and Loodiana,—an outlay which would not be less than £500,000.

3rd.—That a saving in time in despatching stores to the front would be effected, the importance of which, on an emergency, no mere money value can measure.

4th.—That in lieu of a position which is radically defective as an offensive and defensive base of operation, and one from which a forward movement could only with difficulty and delay be supported, and on which it would be almost impossible to fall back with advantage, as by doing so an army would have to swerve from its true line of communication, Government would possess a strategically strong and convenient base suited alike for offensive and defensive operations.

The Commission adjourned at 4-30 P.M. until 12 noon on the 23rd when it was decided to take up the discussion on establishments and camp equipage, &c.

*Minute 134, dated 23rd Feb. 1875.*

The Commission met at 12 noon at Colonel Stewart's.

Papers on portion "establishments" submitted by the sub-committee, and on "camp equipage" were read and adopted.

Adjourned at 4-45 p. m.

*Minute 135, dated 25th Feb. 1875.*

The Commission met at 12 noon at Colonel Stewart's.

Papers regarding establishments were read, and adopted, and a tabular statement ordered to be drawn up.

Adjourned in order to allow Colonel Hatch to complete memorandum on establishments. The sub-committees to proceed with their respective work.

Adjourned at 5 p. m.

*Minute 136, dated 1st Mar. 1875.*

The Commission met at 11 A. M., to record proceedings, &c.; proceedings recorded in minutes 133, 134, 135.

Memorandum by the President on the foundry and shell factory, Cossipore, was read.

The Commission adjourned to Colonel Stewart's.

Memorandum on arsenal and factory accounts submitted by Mr. Haliburton, and after discussion, adopted for the report. The remaining portion to be drawn up by Colonel Hatch for the appendix, and when printed to be considered.

The Commission considered and discussed a portion of the report submitted by the Secretary.

Adjourned at 4-30 p. m.

*Minute 137, dated 2nd Mar. 1875.*

Met at 12 noon. Proceeded with discussion of report.

Adjourned at 4-45 p. m.

*Minute 138, dated 4th Mar. 1875.*

The Commission met at 12 noon at Colonel Stewart's for the consideration of the report.

Read memorandum by the President on the subject of the Harness Factory at Cawnpore.

Determined to prepare resolution in the sense of the memorandum.

Read memorandum by the President regarding the Foundry and Shell Factory at Cossipore. Resolved to adopt suggestions therein made and to report accordingly.

Read resolution on Small Arm Ammunition Factories proposed by Colonel Hatch.

Approved and adopted for report.

Adjourned at 3-30 until Saturday at noon; sub-committees meanwhile proceeding with the subjects they have in hand.

The Commission met at 1 P. M. at *Minute 139, dated 8th Mar. 1875*  
Colonel Stewart's.

Minutes 136, 137, 138 read and confirmed.

Decided that beyond the appendices prepared by the members or specially ordered to be prepared, only the abstracts need be entered.

Map I, proof submitted and approved by Commission.

First proof of revised draft report, "introduction," received and read.

Draft resolution on Harness and Saddlery read by the President and adopted for the report.

Report of progress was made by the Secretary.

Adjourned at 4-30 P. M., until 12 noon on the following day.

The Commission met at 12 noon at *Minute 140, dated 9th Mar. 1875.*  
Colonel Stewart's.

Minute 139 read and confirmed.

Memorandum on "allotment of stores" read by the President, and agreed to generally.

Resolved that a resolution be drawn up regarding the system of supply of Small Arm Ammunition, recommending that central stations or garrison magazines shall be formed to contain the service and practice ammunition of regiments except 20 rounds in pouch.

Resolved that the revised draft report shall be considered as a whole when printed, and then para. by para.

Adjourned at 1-45 P. M. *sine die*.

The Commission met at 10 A. M. *Minute 141, dated 13th Mar. 1875.*

Minute 140, read and approved.

Draft resolution on "Small Arm Ammunition" read by the President, and ordered to be printed.

Draft on allotment of stores read by the President and ordered to be printed.

Proof of draft on "Camp Equipage" read by Mr. Haliburton, and discussed and accepted.

Portion of revised draft report read and discussed.

Decided that the papers selected by the President and Members in the different subjects for the appendices be printed after the report is finished.

Adjourned at 5-30 P. M. until 10 A. M. Monday, 15th instant.

The Commission met at 10 A. M. *Minute 142, dated 15th Mar. 1875.*

Minute 141 was read and confirmed.

Revised draft report considered as far as first page of section III. Ordered to be sent to press for final revised proof.

Portion, "Executive work in Arsenals", revised by Colonel Hatch, adopted and ordered to be sent to press.

Adjourned at 2 P. M. until 12 noon on the 16th instant, when the revision of the report would be proceeded with.

143, dated 17th Mar. 1875.

The Commission met at 12 noon.

Minute 142 of 15th March 1875 was read and confirmed.

Decided that a paragraph shall be added in the financial review at the end of report, as to cost of building at Avady and St. Thomas' Mount.

Decided that the returns headed "Carriages" complained of be entered in appendix.

Decided that tables "circles of supply" be entered in appendix.

Report of progress submitted, and order for report and appendices agreed to as marginally noted.

Revision of draft report continued.

Adjourned at 6-15 P. M. until 10 A. M. on the 18th.

#### INTRODUCTORY.

- II.—
- III.—
- IV.—Factories.
- V.—Circles of Supply.
- VI.—Allotment of stores.
- VII.—Establishments.
- VIII.—Executive work in arsenals.
- IX.—S. A. Ammunition.
- X.—Camp equipage.

#### APPENDICES.

*Minutes of Members on various subjects.*

- A. )
- B. )
- C. )
- D. )

E.—Tables of military stations dependent and arsenals, &c.

F.—Appendix giving information on each arsenal, &c.

G.—General Tables, Freight, Transport, &c.

H.—Factories.

J.—Proposed circles of supply.

K.—Allotment of stores.

L.—Existing Establishment, work done, &c.

M.—Proposed Establishment ... { Arsenals.  
Factories.

N.—Executive work in arsenals, &c., and accounts.

O.—S. A. Ammunition.

P.—Camp Equipage.

Q.—Evidence of C. Officers.

Minute 144, dated 18th Mar. 1875.

The Commission met at 10 A. M.

Minute 143 was read and confirmed.

Revision of draft report, section III, was finished.

Section IV partly revised.

Adjourned at 5-45 P. M. until 10 A. M., 19th instant.

Minute 145, dated 19th Mar. 1875.

The Commission met at 10 A. M.

Minute 144 was read and confirmed.

The Commission continued the revision of the report.

Decided that a letter be addressed to Government asking for sanction to Colonel Stewart remaining for about a fortnight to complete the revision and arrangement of appendices.

Adjourned at 2-30 P. M. until Monday, the 22nd, at 10 A. M.

Minute 146, dated 22nd Mar. 1875.

The Commission met at 10 A. M.

Minute No. 145 was read and confirmed.

Letter from Colonel Macgregor (without date) read by the President, and decided that the notes therein referred to may be included in the appendix, and to be noted as received too late for consideration.

Draft for report on Gunpowder Factories read by Colonel Stewart and adopted.

Proof "Circles of Supply" corrected.

Concluding paragraph of report read by Mr. Haliburton and adopted.

Proof "Executive work in arsenals" revised.

Proof "Allotments of stores" revised.  
Paragraphs of report "Establishments" prepared.

Adjourned at 6-30 P. M. until 10 A. M. the following day.

The Commission met at 10 A. M.

*Minute 147, dated 23rd Mar.*

Minute No. 146 read and confirmed.

The Commission discussed the question of "Establishments" and drew up paragraphs for the report.

Decided that in the appendices on arsenals—

1. No information on native states need be entered.
  2. No papers as to particular distribution of workmen, lascars, &c., need be entered.
  3. No lists of books need be entered.
- table of Establishments was discussed and certain alterations agreed on.  
Adjourned at 5-30.

Commission met at 11 A. M.

*Minute 148, dated 25th Mar. 1875.*

discussed portion of the draft relating to Gunpowder Factories:  
Adjourned at 2-30 P. M. until 10 A. M. the 27th instant, when it was decided to consider the portions of the report relating to Gunpowder Factories; section VI, Allotment of Stores; section VIII, Establishments; section IX, Supply of Ammunition, and the resolution by Colonel Macgregor on Defences and Communications.

Adjourned at 6-30 P. M.

The Commission met at 10 A. M.

*Minute 149, dated 27th Mar. 1875.*

Minute No. 148 was read and approved.

Revised draft on "Gunpowder Factories" read by the President, discussed and adopted.

Section VI and Section VIII revised and adopted.

Adjourned at 6-30 P. M.

The Commission met at 11 A. M.

*Minute 150, dated 29th Mar. 1875.*

Minute No. 149 was read and confirmed.

Proceeded with revision of report. Section VIII, Establishments, section IX, System of Supply of Ammunition, and paragraphs on Defences and Communications decided.

Adjourned at 6 P. M.

The Commission met at 1-30 P. M.

*Minute 151, dated 30th Mar. 1875.*

Proof of Gunpowder Factory paper finally settled.

Appendices considered.

Adjourned at 4-30 P. M.

The Commission met at Colonel Stewart's at 11 A. M., to review the work performed by the Sub-Committees since the date of the last meeting.

The Sub-Committee of revision, Colonel Stewart and Mr. Haliburton, have

met daily and completed the revision of the entire report, the final portion of which has been this day despatched to the Government press.

The other Sub-Committee have examined and arranged the papers which the Commission consider should form the appendix to the report.

The Secretary lays before the Commission a memorandum by Lieutenant-Colonel Macgregor on the suitability of certain positions for arsenals, received with demi-official note to the Secretary, dated Kurrachi, 29th March, requiring that the above memorandum be added as an appendix to the report.

The Commission resolve to comply with the above request, and direct that the memorandum be included in Appendix D, as its subject refers to section III.

The Commission adjourn until Wednesday, the 7th instant, at 11 A. M.

*Minute 153, dated 7th April 1875.* The Commission met at 11 A. M., at the Office of the Military Department.

Minutes Nos. 151 and 152 were read and confirmed.

With reference to minute No. 152 and Lieutenant-Colonel Macgregor's notes on positions for arsenals, Colonel Stewart read a note which he proposed to add to that of Lieutenant-Colonel Macgregor.

Adopted and ordered to be added.

Chief Commissioner, Central Provinces' No. 2490 of 2nd April 1875, submitted and ordered to be replied to, to the effect that the fact he stated had been noticed and a recommendation made.

The report of the Commission was signed, the Secretary signing for Lieutenant Colonel Macgregor, as authorised in telegram from Allahabad, No. 687, dated 20th March 1875.

In accordance with the permission of Government, the Special Ordnance Commission dissolved this day.



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